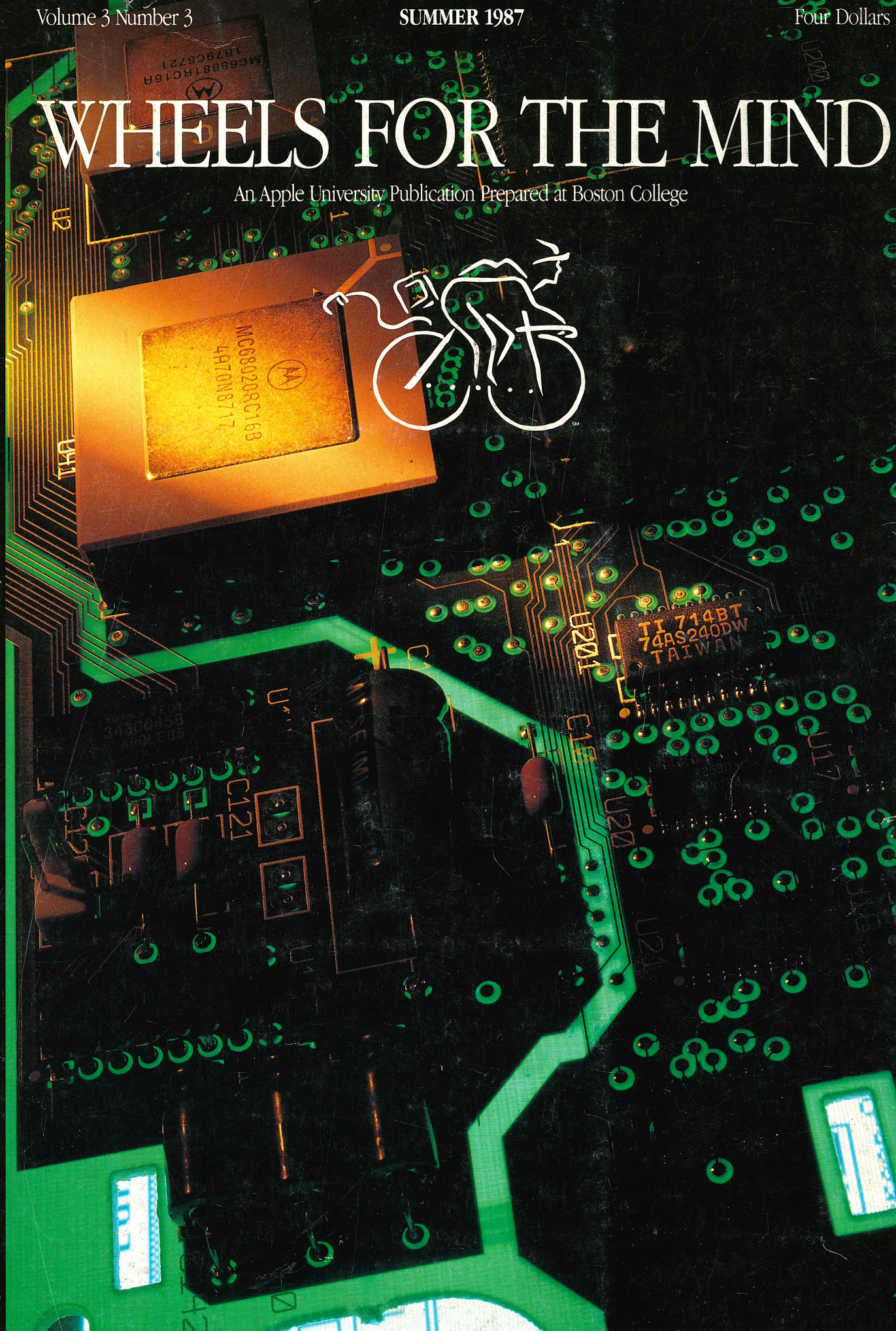
Volume 3 Number 3 SUMMER 1987 Four Dollars

WHEELS FOR THE MIND

An Apple University Publication Prepared at Boston College



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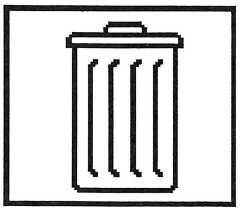
Editorial



Over the next several weeks, we will be working to make *Wheels for the Mind* an even more valuable resource.

To help us include appropriate materials, we need some feedback from you, our readers. Please take a few minutes to fill out the survey that starts on the following page.

As usual, if you wish to send along an article, project status report, or other submission, forward it to:

Peter Olivieri
Wheels for the Mind
Computer Sciences F430
Boston College
Chestnut Hill, MA 02167

AppleLink Address: A0130

Please try to send a disk with your words of wisdom, articles, applications, experiences, or software.* Screen dumps are great, and you are encouraged to include them. All disks will be returned. Of course, you can also send along written material if you like. It's just that disks are easier to handle at this end. The success of this publication depends a lot on the participation and support of all of you. Please contribute: Don't wait for someone else—do it yourself.

Be kind to us—send us your contributions in MacWrite.

Once again, until next time, take care.

* At this point, MacWrite files are by far the simplest for us to deal with. We need to have the MacWrite files to dump into PageMaker. Thank you for your help.

Wheels for the Mind

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Wheels for the Mind
Reader Feedback Form

Section 1.
Please circle the response that best reflects your opinion.

With respect to the sections that currently appear in *Wheels for the Mind*:

Focus	Include less	About the same	Include more
Spotlight	Include less	About the same	Include more
News and Notes	Include less	About the same	Include more
Tips and Techniques	Include less	About the same	Include more
Products	Include less	About the same	Include more
Resources	Include less	About the same	Include more
Project Reports	Include less	About the same	Include more

Please write down any comments you have concerning any of the above sections:

_____

_____

_____

_____

_____

Section 2.
Please circle the response that best reflects your opinion.

With respect to possible new sections to be included in *Wheels for the Mind*:

a. Interviews with Macintosh users	Include	Don't include	No opinion
b. "How to" articles on using various application packages	Include	Don't include	No opinion
c. Technical information	Include	Don't include	No opinion
d. Programming tutorials	Include	Don't include	No opinion
e. Actual program listings	Include	Don't include	No opinion
f. Question-and-answer column	Include	Don't include	No opinion
g. Product comparison charts	Include	Don't include	No opinion
h. Surveys of what schools are using	Include	Don't include	No opinion

Special topics:

Expert systems	Include	Don't include	No opinion
Authoring	Include	Don't include	No opinion
Interactive video	Include	Don't include	No opinion

What do you suggest? _____

_____

Section 3.
About yourself:

Which Macintosh systems do you have access to at home?

_____

_____

Which Macintosh systems do you have access to at work?

_____

_____

Which software products do you use most often?

_____

_____

What software products would you like to see developed?

_____

_____

Please copy these two pages, complete the form, and send it to:

Peter Olivieri
Wheels for the Mind Survey
Computer Sciences F430
Boston College
Chestnut Hill, MA 02167

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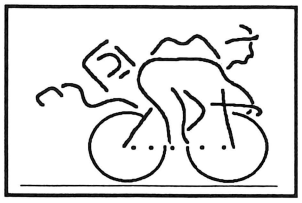

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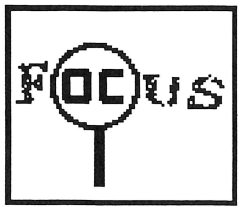
Focus



The **Focus** section will concentrate on a different theme in each *Wheels for the Mind* issue. The focus for this issue will be on use of the Macintosh™ personal computer to enhance communications.

Summer 1987 *Wheels for the Mind*

By Beth Ann Moore
Apple Computer, Inc.

Welcome to the summer issue of *Wheels for the Mind.* This issue will take an eclectic look at an exciting range of Macintosh projects, programs, events, and products at colleges and universities around the country.

Perhaps the one word that captures the essence of this issue is *communication. Wheels* itself is a vehicle for communication, and the articles in this issue all relate to some aspect of communication. Our lead article introduces AppleShare™, the new file-server system from Apple Computer. Now Macintosh users in a workgroup can communicate with each other quickly and easily using the same Macintosh techniques that they use in other applications. With AppleShare, you don't have to speak "protocol-ian" in order to share documents and ideas.

***The essence of this issue is* communication.**

Communicating via the Macintosh is a *high-tech* method of communication. But Macintosh is also being used to improve some very *basic* communication skills, such as writing. And once the basics are mastered, the Macintosh is being used to enhance journalism students' more advanced skills in both written and graphic communications.

Another way that Macintosh is facilitating communication is by bringing people together from all areas of the country to show, share, and discuss their achievements using the Macintosh. Events and conferences—such as the Health Sciences Conference and the Computing in the Liberal Arts Conference, as well as two upcoming events: the MacHack Developers' Meeting and a meeting of English and composition faculty to be held at the University of Nebraska—all improve the quality of communication among peers. The future of communicating, teaching, and learning by

computer can also be glimpsed in an article describing the activities of the Annenberg/CPB Foundation.

This issue will provide some fascinating looks at how people are communicating by using the Macintosh in some way—whether via a network and AppleShare, in writing, graphically, or by sharing common interests in person.

News and Notes will feature a potpourri of interesting articles from disciplines as diverse as psychology, engineering, and physics, as well as the results of the Wheels for the Mind Awards contest.

We think you'll enjoy this issue of *Wheels for the Mind,* and hope that you agree on its value as a communications tool. Please be sure to communicate with *us* by filling out the reader survey and returning it.

After all—communication is *at least* a two-way street.

Workgroup Communications with AppleShare

Computer users need to share data as well as peripherals.

The AppleTalk® Personal Network facilitates the connection of several Macintosh computers to share common peripherals. AppleTalk, however, did not allow for users on the network to share files.

But many computer users need to communicate with one another and share and exchange files that they are working on—to be able to share data as well as peripherals. This sharing process can be accomplished in two ways: with a disk server or with a file server.

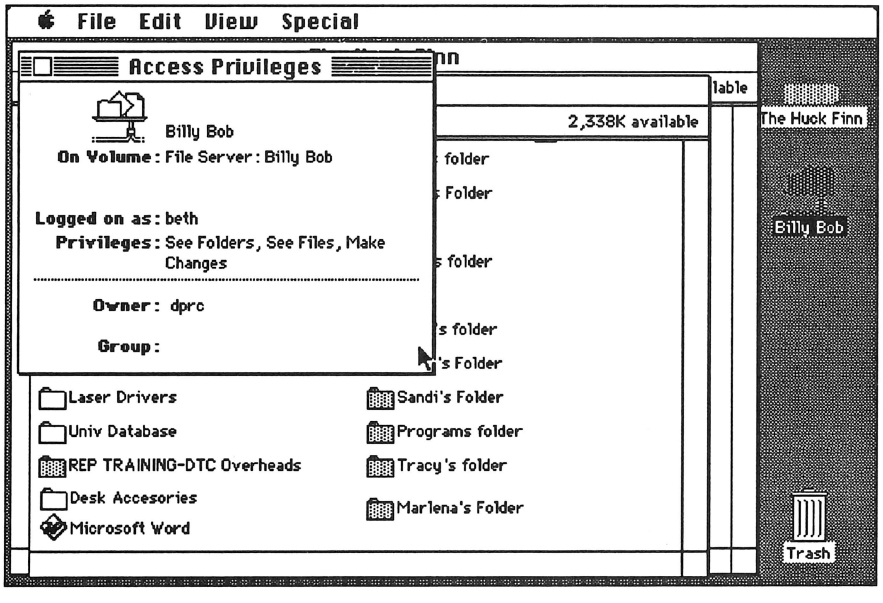
Disk servers have some drawbacks, though. They don't "understand" what a file or a folder is, and thus cannot maintain control over them. In addition, disk servers usually partition their storage equally among the users. This can be quite inefficient, because some users end up with significantly more space than they actually need.

On the other hand, file servers manage space very well, and can dynamically allocate and recover space as warranted. In addition, they can easily recognize all of the hierarchical structures: volumes, files, and folders.

The AppleShare file-server system consists of a dedicated Macintosh with one or more hard disks, and the AppleShare software. The Macintosh can be a Macintosh Plus, a Macintosh SE, or a Macintosh II. The other computers on the network are called workstations, and they can include both Macintosh computers and other microcomputers, if they are equipped with an AppleTalk connector board. The server Macintosh manages the users on the network, assists in file access, stores the files, manages the server's disk space, and responds to other requests from users. Each AppleShare file server can support up to 25 different users.

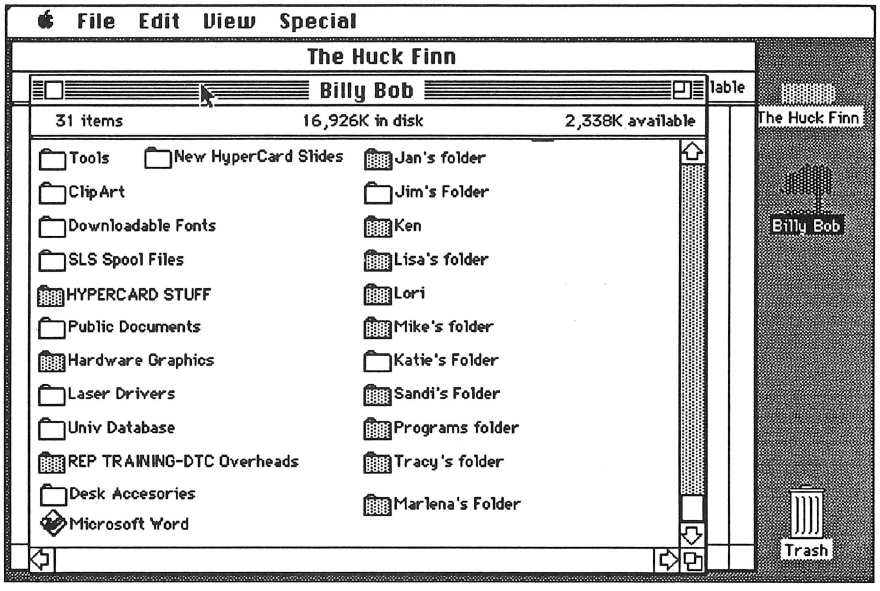
AppleShare can be used by both Macintosh computers and other systems equipped with an AppleTalk connector board.

You sign onto the file-server system with a password that is assigned to you by a "network administrator." (This is the person who sets up the network and is responsible for overseeing its use.) Once you have successfully logged onto the network, you can create files and store them on the server.



When you create a file and store it on the server, that file can initially be accessed only by you. AppleShare lets you control the access of others to your files through assigning "access privileges." There are three privilege levels:

- See Folders
- See Files
- Make Changes



With See Folders privileges, other users can see all your folders, but cannot access their contents. See Files lets other users open, read, and even copy the files, but doesn't allow them to make any changes. Make Changes offers complete access. If you do not have access privileges for certain files, their icons will appear dimmed on your screen.

More and more multiuser software is being developed.

As more and more AppleShare servers are installed on AppleTalk networks, you can expect to see more multiuser applications software being developed. Several such products already exist, including Helix from Odesta and Omnis 3 from Blyth Software. With such software, users on the network have the ability to update shared files simultaneously. And because it uses the AppleTalk network architecture, AppleShare currently supports products such as InBox from Think Technologies for electronic mail. With InBox, you can send memos to individuals or to groups of people and receive electronic confirmation that your memos have been read.

AppleShare is ideal for classrooms, student computer labs, faculty offices, businesses, and other local workgroups. By using communications links, one AppleShare network can communicate with another AppleShare network or with your campus networks.

For more information on AppleShare, contact your local campus Apple representative.

Macintosh in Writing Across the Country

By Beth Ann Moore
Apple Computer, Inc.

Writing. It is so basic and necessary (doesn't everyone know how to write?), yet good writing is one of the most difficult skills for most people to master. Journalists are not the only writers in our society. Whether you're an an engineer, a professor, a librarian, a musician, or a salesperson, you need to be able to communicate your ideas clearly to other people in order to be understood—and successful. We all think we're quick to pick up mistakes in spelling or grammar when reading advertisements, pamphlets, newspapers, memos, and so forth. But when we sit down with a pen in our own hand, the process of writing suddenly becomes difficult—and often frustrating.

There is a tremendous push in higher education to improve the writing curriculum.

Over the past 12 months, we've noticed a tremendous push in institutions of higher education for the improvement of writing curriculum, and for the integration of good writing skills into many other disciplines. The computer—especially the Macintosh—has come to be viewed as an important tool in writing instruction for several reasons:

- It facilitates the organization of ideas.
- It enables a person to work with several versions of the same idea easily.
- It allows analysis of writing structure, grammar, spelling, and punctuation.
- It is a fantastic editing tool, which allows a writer to easily change the composition of a work, or an instructor to critique a student's work without actually altering it.

Perhaps the most compelling reason for using the computer as a tool is that it is just that—a tool. It will never replace critical thinking and great ideas, but it *does* enable people to get those thoughts down quickly and to work with them, polish them, and produce the best possible final expression of them.

Included in this section are examples of the software tools being used around the country in the teaching of writing. There are also real-life examples of how faculty at many different colleges and universities around the country have taken the Macintosh and made it the tool of choice in improved writing and composition programs. Some institutions, like the University of California at Davis, have taken it a step further and use Macintosh in an Adjunct Writing Program that incorporates the teaching of writing as an integral part of many disciplines.

Each of the schools mentioned in the following examples has taken its own approach to the use of Macintosh in writing instruction. For some interesting insights and inspirational ideas—read on!

University of California at Davis: Writing Program

U.C. Davis has one of the best writing programs in the country, featuring a range of writing courses from Beginning English to Advanced Writing and Composition.

The main tool used is MacWrite®, because instructors feel that it is the least intimidating word-processing package available. They found that other, more complex word-processing software tended to intimidate—rather than enable—students who are having difficulty writing.

The Adjunct Writing Program treats writing as an integral part of* all *academic disciplines.

One rather unusual class is Adjunct Writing, which is taught each academic quarter in conjunction with a different discipline. (This quarter it is being taught with engineering students. Next quarter, it will be taught with computer science students.) Students in Adjunct Writing classes treat writing assignments that are part of their discipline's coursework as opportunities to improve their writing skills. The class fosters the view that writing is an integral part of *all* academic disciplines. It enables students in every area to be more productive in conveying ideas through their writing.

For more information, contact:
Eric Schroeder
U.C. Davis Writing Center
University of California at Davis
(916) 752-8024

University of Mississippi: Using the Macintosh in the Writing Program

The Department of English at the University of Mississippi began operating a microcomputer lab for Freshman English students in August 1986. Limited to 360 students at present, this lab will be expanded to accommodate the approximately 1,400 freshmen in

the composition program. It will also serve students in the junior-level Advanced Composition course. Currently, the lab is open 65 hours each week and is staffed primarily by graduate teaching assistants.

After two years of reviewing software and experimenting with various micros, the department chose to use the Macintosh. The reason: it was the easiest for students to learn to use, and it could do everything the students needed to do. There are now eleven Macintosh 512K Enhanced computers in the lab, with one of the eleven functioning as a file server on the AppleTalk network. Two ImageWriter® II printers are handling the needs of the students adequately, but the plan is to reduce the ratio of computers to printers to 3-to-1. The school hopes to add fifteen Macintosh systems and five more ImageWriter printers within the next three months. The ultimate goal is to have 75 to 100 Macintosh computers in the lab (or in several labs).

MacWrite is the word processor currently used in the lab, but the plan is to replace MacWrite with Microsoft Word, which handles footnotes more easily, a feature that is important for freshman composition students writing research papers. MacWrite was originally chosen because it came with MacProof, an editing program developed by Automated Language Systems of Provo, Utah.

MacProof deals with most common errors made by beginning writers.

MacProof deals with most common errors made by beginning writers, and may be used as a stand-alone application or on a network. It comes with a very useful systems and language tutorial manual and an excellent lab operations manual is also available. Before long, a teacher's manual will be available, along with exercises and advice on implementing MacProof in the composition class.

When a student enters MacProof and opens the file of an essay in progress, the program can check for the following: spelling, punctuation, and capitalization errors; racist and sexist language; incorrect and inappropriate words; passive voice; and nominalizations. In addition, there is a function that displays the first and last sentences of each paragraph, and another that lists each sentence as a separate line item. These are quite helpful in checking sentence structure and paragraph development.

Although it is obviously too early to determine that the students using the lab are writing better prose, we *can* say that their attitudes about writing have improved—and that the dispositions of the instructors (who now receive nicely typed essays) are also much improved.

For more information, contact:
Dr. T. J. Ray
323 Bishop Hall
University, MS 38677
(601) 232-7678

New York University: Expository Writing Program

In January, NYU's Expository Writing Program opened a Macintosh classroom, the latest in an ongoing investigation of the impact of computers on the composition process. For the past three years, teacher-researchers at NYU have been working with mainframes and micros in the classroom and Writing Center in composition instruction and writing conferences. The Macintosh classroom is the synthesis of this work, and provides an environment for generating new research.

The Macintosh graphics and DTP abilities open up new ways of thinking about writing.

Professor Jeffrey Spear, the Expository Writing Program director, says he thought carefully about the pedagogical implications of each decision—everything from which computer to buy to how the tables would be arranged in the room. "We chose Macintoshes because they could be networked easily, were easy for students to use, and were more affordable than IBM computers with similar capacities. Also, the Macintosh graphics and desktop publishing abilities open up new ways of thinking about what written texts are and might be."

The MacWorkshop, as it's called at NYU, has 16 Macintosh 512K Enhanced computers with external 800K drives, connected via AppleTalk to a Macintosh Plus with a Hard Disk 20 running Infosphere's MacServe disk-server software. Two ImageWriter II printers and a LaserWriter® printer provide hard copy. Nine sections of NYU's required freshman Expository Writing course are being taught in the MacWorkshop this semester. Using WordHandler, a simple but flexible word processor, students compose essays and respond to other students' essays. MacServe makes sharing their writing as easy as using a desk accessory.

The MacWorkshop encourages a collegial atmosphere among students and faculty.

Classes meet in the MacWorkshop, allowing students to engage in group sharing and critiques or to break up into small groups for collaborative writing. Evening lab hours allow students to drop in to work on the Macintosh systems and to respond to each other at their own pace. They can come to class sessions more prepared; and fewer copying and distribution bottlenecks mean that class discussions are more productive. Even if students miss a session, they can drop into the lab and catch up by checking the hard disk. The workshop also encourages a collegial atmosphere among students and faculty that continues outside of class hours.

According to John McDaid, the coordinator of computer composition, the networked classroom represents an ideal environment for implementing modern composition theory: it makes the workshop a collaborative learning environment. The MacWorkshop

empowers the students by giving them control over and responsibility for their own writing. It makes writing a real act of communication—one that allows students to develop a sense of audience—and provides a natural motive for revision.

The Writing Center offers nonjudgmental feedback on writing and many other services on-line.

The Expository Writing Program also uses Macintosh computers in its innovative on-line Writing Center. The Writing Center is a facility where all members of the NYU community can—and do—come to receive nonjudgmental feedback on their writing. Last year, Jeff Spear and Lil Brannon received an NYU grant to purchase Macintosh computers and to train consultants. With an Apple® modem and MacTerminal®, one Macintosh was linked to the university's VAX mainframe cluster, allowing any user on the system to send writing via e-mail to the center for response. This semester, with the addition of Red Ryder Host BBS software, the Writing Center went on-line independently. Any member of the NYU community with a personal computer and modem can now dial up directly and upload writing for conferencing, send e-mail, read and respond to messages, and browse through the library of writing the center maintains. Red Ryder Host has proved to be ideal software for this type of application: total learning time for running the BBS is just a few hours, and the Macintosh-style editor allows total customization of menus and features.

For more information, contact:
Prof. Jeffrey Spear
Director, Expository Writing Program
New York University
269 Mercer St., 2nd Floor
New York, NY 10003
(212) 598-7945
BITNET:MCDAID@NYUACF

The NYU on-line Writing Center is also a resource for colleagues in composition instruction. Educators are invited to dial in and link up. The BBS hours are Monday through Thursday, 6 P.M.–9 P.M. EST, with 24-hour access Friday through Sunday. MacWorkshop BBS: (212) 598-2781

Macintosh Computers: Making an Impact on Journalism

Macintosh is becoming the computer of choice in more and more journalism schools around the country. With its ease of learning, superior graphics capability, and ability to integrate graphics into text, Macintosh helps students get up and running quickly. This means they can spend their time learning the principles of journalism, rather than learning how to use a computer.

Macintosh is so flexible that students are using it to learn writing and editing, elements of graphic design, and page layout.

The following is a list of journalism schools that are currently using Macintosh.

Brigham Young University
The school newspaper is produced using the Macintosh computer and LaserWriter printer.

Cal State Fresno
Cal State Fresno is using Macintosh to publish two papers, the *Daily Collegian* and a weekly publication, *Insight.*

Drake University
The School of Journalism at Drake University is doing several interesting projects with Macintosh, as well as producing the campus newspaper with Macintosh and the LaserWriter printer. For more information, the contact person at Drake University is Michael Cheney, at (515) 271-3123.

Many school newspapers are produced using the Macintosh.

Florida A & M University
Florida A & M's School of Journalism has installed 15 Macintosh computers. The systems are currently being used in journalism and graphics classes, and to produce the school paper.

Humboldt State University
This semester the *Lumberjack* school newspaper is being produced using Macintosh.

Oakland University
Oakland University in Rochester, Michigan, has just installed a large Macintosh laboratory for use in teaching journalism classes.

Ohio University
At Ohio University, the journalism faculty are using Macintosh for a variety of classes and projects. Byron Scott is the contact person, at (614) 593-1000.

Rutgers University
Dania Stagger-Snow, of the School of Journalism, is teaching writing to journalism graduate students using Microsoft Word and PROSE, an application developed at Cornell University for the teaching of writing and composition. Rutgers has also added a desktop publishing module to the course curriculum. Stagger-Snow can be reached at (201) 932-7725.

Southern Methodist University
Macintosh is used for various projects by the School of Journalism at Southern Methodist University.

Texas Tech University
Texas Tech has installed a Macintosh laboratory in its School of Journalism.

University of Alabama
At the University of Alabama, instructor Marie Parsons has begun teaching journalism classes with the Macintosh. She can be reached at (205) 348-8618.

University of Colorado
The advertising class at the University of Colorado is learning on Macintosh. The faculty also have Macintosh computers and are using the Macintosh and LaserWriter printer for course syllabi and teaching materials. Recently, *The Campus Press,* the university's campus newspaper, was named the best college newspaper in the nation, besting 269 entries in the "Mark of Excellence" competition sponsored by the Society of Professional Journalists. For more information, contact Sandra Moriarty at (303) 492-1451.

University of Houston
The University of Houston is also using Macintosh in the School of Journalism. For more information, see the article on page 13.

University of Iowa
Professor John Bennett is studying the impact of desktop publishing on entrepreneurialism, as well as teaching classes on graphic design and page layout.

University of Maryland
Professor Phil Geraci is teaching computer-assisted graphics in journalism. The school also publishes a county newspaper.

University of Missouri at Kansas City
The Science Journalism Center has just begun using three Macintosh computers and a LaserWriter printer. The center is a clearinghouse for information on science journalism.

University of North Carolina at Chapel Hill
A new writing lab in the journalism school is being used in conjunction with journalism courses. Next year, the school may add a lab for use in page layout and graphics courses.

University of Missouri at Columbia: School of Journalism

The University of Missouri at Columbia's School of Journalism is one of the top journalism schools in the country. Of the 900 students enrolled in the School of Journalism, approximately 260 are advertising majors. Over the past year, the school has incorporated Macintosh into the advertising curriculum, and the Macintosh laboratory is put to heavy use.

Drs. Guy Tunnicliffe and Birgit Wassmuth of the advertising department felt that it was important for students to work with an up-to-date microcomputer system that could handle text and graphics. They chose Macintosh for several reasons: the superior graphics capabilities, the ability to combine text and graphics, and the machine's ease of learning, which helps students feel comfortable with the computer quickly.

The Macintosh is used for five basic journalism courses.

Last fall, a journalism lab was installed, with 25 Macintosh computers, three LaserWriter printers, and several disk servers. Five basic journalism courses utilized the lab for coursework:

- **Advertising Principles**—In this beginning course, students utilize the lab to do basic copywriting and advertising layout assignments.

- **Graphics of Journalism**—This course includes six lab sessions of 25 students each. All visual aspects of mass communication are studied, including logo design, ad layout, and magazine layout. Software used in the lab includes MacDraw®, MacPaint®, and PageMaker.

- **Basic Advertising Copy**—This course covers basic copywriting using MacWrite.

- **Advanced Advertising Design**—This includes one lab session using Macintosh to produce ads and logos. Macintosh is used in conjunction with different rendering techniques and skills.

- **Creative Strategy**—In this course, students combine all the elements of advertising they have learned to produce a portfolio of advertisements. The Macintosh and LaserWriter are used.

The goal is to use the Macintosh lab for* all *media courses.

Eventually, the hope is to add all media courses to the lab schedule. Media classes learn about many different types of media—newspapers, magazines, outdoor advertising, scheduling, market demographics, and more. The Macintosh—combined with spreadsheet, project-planning, word-processing, page-layout, graphics, and scanning software—will be a useful tool for planning media campaigns, estimating costs, implementing schedules, and determining advertisement frequency.

At the moment, Macintosh computers and a LaserWriter printer are also being used to produce *The Missourian*, the daily paper owned by the journalism school. Journalism students work on the newspaper as part of their program requirements.

Other journalism schools around the country have contacted the University of Missouri for information and advice on integrating computers into their journalism instruction. And with the advent of new, more powerful hardware and software, the School of Journalism will be able to continue to expand its capabilities.

University of Houston: The School of Communication

Last fall, the University of Houston's School of Communication set up a laboratory of 31 Macintosh computers, and the journalism professors faced an immediate challenge. The computers were being set up in a news editing laboratory, and students were expected to begin using them that semester. But faculty and staff didn't let the short time frame keep them from moving ahead. Shortly after the semester began, students were using the computers for word processing and editing.

Faculty and staff in the School of Communication had wanted for some time to use microcomputer capabilities in a news editing lab for the journalism program. Craig Ness, associate director for operations in the school, said the Macintosh computers are being used in several required courses. Specifically, students in News Reporting I, News Reporting II, and News Editing are using Macintosh for creating, editing, and printing news stories.

The School of Communication had wanted for some time to use microcomputers in a news editing lab.

Before the Macintosh cluster in the communications building was set up, the only access journalism students had to computing equipment was through the *Daily Cougar,* a student-published newspaper. Many journalism students spent lab time or their own free time working for the newspaper. But the time that students could afford to spend working at the *Daily Cougar* was often limited, and computer instruction was at a premium because of deadline pressures. The new Macintosh computers move computer instruction into the classroom, where the students can simultaneously learn technology skills and journalism skills.

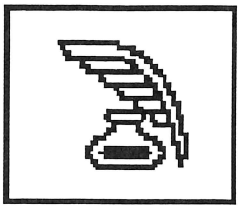
Plans for using the Macintosh computers extend beyond the currently offered instruction to such applications as spreadsheets, graphics, and desktop publishing, which will fit easily into Graphics Applications, Media Management, and other classes.

Now, however, the push is in basic news reporting and editing classes. Ted Stanton and Dr. Campbell Titchener, professors using the computers in their classes, agree that journalism students need basic computing skills in today's newsrooms. Word processing, on-line editing, and other applications are standard fare in newsrooms all over the country. But computers don't replace good writing and editing skills. Therefore, journalism classes will use the computers as tools, and continue to focus on the arts of reporting, writing, and editing. After all, the aim of the journalism program at the University of Houston is not to turn out computer scientists, but to train journalists.

Computers don't replace good writing and editing skills, they are just tools.

Information for this article comes from The University Computing Source, *published by University Computing at the University of Houston, fall 1986.*

Spotlight



The **Spotlight** section will focus on some of the Macintosh activities that are going on at various schools and universities. Typically, there will be two parts: the first will describe the activities that coincide with the theme of that particular *Wheels for the Mind* issue; the second will be more general, and describe a variety of interesting programs and activities.

Brandeis University: Macintosh Computers in Experimental Psychology

Students in the Experimental Psychology course at Brandeis University are using the Macintosh this semester to design a laboratory experiment, run it, and collect and analyze the data. The purpose of the experiment is to test the students' hypotheses concerning the reactions of people to various types of facial features.

The experimental stimuli are human faces designed with the aid of the commercial program Mac-a-Mug, by Shaherazam. After designing various faces and saving them as MacPaint documents, the students prepare a text file that stipulates how these pictures are to be collected into groups, what questions are to be asked of the subjects about the pictures, what rating scales are to be used to enable the subjects to answer the questions, and other details about the experiment.

A TML Pascal program, written by student programmers working for the Office of Educational Computing, analyzes this text file, then directs the computer to present the stimuli and the questions to individual student subjects. The subject sees a series of faces on the Macintosh screen, each accompanied by a question and a rating scale, and answers the question by clicking on the scale with the mouse. The program automatically collects the data, including what group the subject was in, what group of pictures was shown and in what order, and what the answers to the questions were, creating a descriptive text file as it goes along. The final stage of the experiment has the student transcribing this file into a strict data file, which is then analyzed using both the CLR ANOVA program and a correlation program that was written at Brandeis.

The subject sees a series of faces on the Macintosh screen.

For more information, contact:
Prof. Leslie McArthur
Brandeis University
Psychology Department
Waltham, MA 02254
(617) 736-3303

or

Dr. Naomi Schmidt
Director of Educational Computing
Feldberg 126
Brandeis University
Waltham, MA 02254
(617) 736-2080

University of Houston: Engineering Applications

The College of Engineering is using Macintosh in many areas.

About two years ago, the school's Cullen College of Engineering entered the Macintosh world with the purchase of 60 computers. The first machines were Macintosh 128K and 512K computers with 400K external disk drives and ImageWriter printers. This population has now grown to approximately 200 machines, and the mix covers the entire Macintosh product line, as well as LaserWriter printers. The few remaining 128K machines will be upgraded shortly.

In August of 1985, with the help of the W.M. Keck Foundation, the college established an instructional laboratory with 32 Macintosh 512K computers and ImageWriter printers. This lab is open 78 hours per week and is available to all college personnel. Even between semesters, the lab is used by students. While its main use is for word processing—particularly for lab reports—software for data analysis, data presentation, and graphics is also available. Programming languages such as BASIC, Pascal, and LISP can also be checked out.

The College of Engineering is using Macintosh in many areas. In instruction, several software packages are used, one of which is LogicWorks for digital circuit analysis. Custom packages have also been written by faculty for use by students in their assignments.

Macintosh is being used for data analysis and presentation, word processing, and telecommunications in many of the research and teaching labs. Macintosh computers are also found in the majority of the faculty and staff offices and are being used in all aspects of personal computing.

Work is in progress to integrate the Macintosh into the college's Ethernet network. Until now, Macintosh users wishing to communicate with the the college's VAX computers were limited to having their computers act as terminals on the Sytek network and using Kermit to transfer files. Now, individual departmental AppleTalk networks will be created using PhoneNet and attached to the Ethernet network via the Kinetics' FastPath box and Alisa-Talk software. And the college will continue to pursue networking plans that improve the Macintosh as a workstation for the engineering environment.

For additional information, contact:
Judy Swasey
Apple Computer, Inc.
2950 North Loop West, Suite 1070
Houston, TX 77092
(713) 682-3200

or

Cindy Spitel
University of Houston
(713) 749-2531

University of Missouri at Columbia: Macintosh in Epidemiology

A series of exercises has been developed for the teaching of introductory biometrics, demographics, and epidemiology using a Macintosh Plus, StatWorks, and Cricket Graph software. A preparatory exercise, based on data from Schwabe et al. (1977), requires students to calculate the most basic statistics—statistics for grouped data and graphs—manually. The same data are then entered in the computer, and the basic calculations and graphics repeated.

A second exercise is based on professional demographics obtained from the last ten years' editions of the American Veterinary Medical Association. The total number of practitioners, the different main groups of practice activities and their relative frequency for each year are entered and analyzed, this time introducing the concept of linear regression.

A third exercise is based on a survey of the class, conducted by the students, using themselves as subjects. The exercise starts with the creation of groups within the class, and with the development of a questionnaire. The basic characteristics (student number; year, month, and day of birth; age; and gender) and some other variables (color of the eyes, left-handedness, and so on) permit

elementary computation of demographic distributions, a very simple introduction of the concepts of prevalence and incidence, and the application of the rudiments of independence/association, correlation and regression analyses, and hypothesis testing.

As the course advances, students utilize the computer to do calculations.

As the course advances, students utilize the computer to do calculations on other authors' data retrospectively: the available data on an Early Fatal Disease Syndrome as induced by Feline Leukemia virus were compiled, and the students do a critical/numerical retrospective review of the articles' data.

Several of the problems in Schwabe et al. (1977) are assigned to the students to be entered into the computer, analyzed, and reported on to the class. All exercises are presented in the form of professional reports to the instructor. Finally, a term paper is presented to the instructor, frequently with statistical review of the data of other authors. For the reports and the term paper, word processing has been encouraged. The "importation" of graphs into the text is a very useful technique for the latter two purposes.

For more information, contact:
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College of Veterinary Medicine
University of Missouri at Columbia
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(314) 882-6068

University of Tennessee at Chattanooga: Microcomputer Use in Physics

By Dr. Eric T. Lane
The Department of Physics and Astronomy
University of Tennessee at Chattanooga

The faculty members in the physics department have been active in the use of microcomputers in physics classes, in the laboratory, and in individual study. We do much of our own programming, and we are now in the process of converting applications that we have run on the Apple II and other microcomputers to run on the Macintosh. The following describes some of the applications.

We have developed Animation Demonstrations, a series of animations of wave motion, particle motion in kinetic theory, and electron waves. We use these demonstrations in the classroom, as complementary material in the laboratory, and as extra material for individual study. These programs can be used in advanced

physics, introductory college physics, high school, and down to grade school science. They are published and distributed to educators and scientists worldwide for classes, labs, and other projects.

For several years now, we have run a modern physics laboratory with a Spectral Analyzer program. The students use a grating spectrometer to obtain photographs of various spectra, such as sodium and lithium. After measuring the line wavelengths, they enter their data into the microcomputer program. Based on three lines chosen by the student, the program computes the spectral lines of a series, the energy levels, and the Rydberg constant. If the lines in the calculated series match up with the experimentally measured lines, the students know that they have found the proper series. They are then asked to use the calculated energy levels to design an energy-level diagram for the series. If done by hand, this calculation would take several weeks, and therefore is rarely, if ever, done by students at this level. Yet the concept is quite important in the development of the students' conceptual background in physics. The exercise works very well, with most students gaining a better understanding of how energy-level diagrams are derived from experimental spectral data. We anticipate converting this program to run on the Macintosh.

In the basic physics laboratory, we have used the Apple II version of the Group Velocity program to give the students practice in distinguishing between wave and group velocity. The program provides a good complement to the usual laboratory exercises, and the students find it interesting and useful.

The basic physics students have also used the Standing Waves program in conjunction with the standing-wave experiment done in the laboratory. This program has even been quite useful to several music students (on an individual study basis), who say they gained a better understanding of waves as they apply to their instruments.

One program will let students study nuclear binding energy.

We are now working on a Nuclear Mass Data Base program, which will allow students to study nuclear binding energy and its implications for nuclear stability and decay against alpha, beta, positron, proton, or neutron emission. The students have access to more than 1,500 isotopes as a function of Z, N, or A. They can look at correlations, in tabular or graph format, among all quantities derivable from nuclear masses. For example, the plots clearly show the minima corresponding to the most stable nuclei. This program is being used now in an introductory nuclear physics course at the senior level. It could be used with a variety of students from graduate school down to the high school level. We presently have a Macintosh version running without the Macintosh interface, and expect to have full Macintosh and Apple II versions soon.

In the advanced thermodynamics class, the Ideal Gas microcomputer program calculates and graphs the pressure, volume, temperature, entropy, work done, and heat energy of an ideal gas as it goes from one condition to another. This program proves quite

The Ideal Gas program can help students visualize what goes on during an engine or refrigerator cycle.

useful in illustrating the behavior of thermodynamic systems during various changes in conditions. It also can help the student visualize and understand what goes on during an engine or refrigerator cycle. It has been used in class demonstrations, as a laboratory exercise, and for individual study. It also is being used in chemistry classes.

Group Velocity, Standing Waves, Ideal Gas, and Animation Demonstrations were developed by Dr. Eric T. Lane for the Apple II microcomputer. Spectral Analyzer was written for the Apple II by Dr. Lane at the suggestion of Dr. Randolph Peterson, also of UTC's physics department. Nuclear Mass Data Base is being developed by Dr. Peterson on the Macintosh and by Dr. Lane on the Apple II. The conversion of the Animation Demonstrations from the Apple II to the Macintosh and Rainbow microcomputers is being supported by the Center of Excellence for Computer Applications at the University of Tennessee at Chattanooga.

Group Velocity, Standing Waves, and Animation Demonstrations are available, contact:
CONDUIT
Room 4557, Oakdale Hall
University of Iowa
Oakdale, IA 52319
(319) 335-4100

Brigham Young University: Departmental Use of Macintosh Computers

An AppleTalk node is installed in each statistics professor's office.

Statistics

The statistics department computer configuration at Brigham Young University includes access to a VAX 8600 (VMS), MicroVAX (VMS), MicroVAX (ULTRIX), two DEC laser printers, and a 32-node AppleTalk network. An AppleTalk node is installed in each statistics professor's office. The network is served by a 10+10 Bernoulli Box Network Server with a shared LaserWriter printer. Faculty work with *S*, a mainframe statistics package, using Macintosh as a graphics terminal. Running MacWrite and VersaTerm under Switcher™, professors generate data on the mainframe, then easily create reports and tests, which are sent (via the AppleTalk network server) to a "finishing station," where an employee cleans up the text, adds equations with MacEqn, and prints the result on the LaserWriter.

TranScript from Adobe converts VAX TROFF files to PostScript® files, which can then be sent to the LaserWriter via a program called ATPrint. Likewise, Macintosh users can use a VAX program, called MacWrite to TROFF, to upload MacWrite files to the VAX and print them on the DEC laser printer.

There are three IBM PCs in the department, which had virtually unused 10+10 Bernoulli Boxes attached. So the PC Bernoulli Boxes have been added to the AppleTalk network with TOPS, giving the AppleTalk network four servers instead of one.

For further information, contact:
Pete Dotson
Software Support/Hardware Maintenance
Statistics Department
204-B TMCB
Brigham Young University
Provo, UT 84604
(801) 378-3484

Computer Consultation Center

Computer Applications Services serves the entire campus with the Computer Consultation Center (CCC). Open 8 to 5 weekdays, the CCC provides a walk-in, hands-on environment where students and faculty have access to most major computer periodicals, a large collection of public domain software, expert technical support in the form of answers to computer-related questions, Macintosh and IBM computers, hard disks, and commercial software packages. The CCC has a large library of commercial software packages that can be tried out in the Center itself or checked out overnight. The availability of software for checkout (with documentation) has helped to decrease illegal software copying during "test drives" for suitability.

Consultants make office calls on campus to solve site-dependent problems. In a separate location, two consultants man a telephone bank to answer call-in questions on any computer subject from ASCII to Zilog. In front of each "phone consultant" is an IBM PC/XT/AT and a Macintosh with a LoDown 20 SCSI hard disk. This gives the consultants virtually instant access to the same software the caller is using, so they can work through the problem together.

The CCC staff holds weekly training meetings so that each consultant can became proficient on most major software packages. They also run a free bulletin board service with FIDO software on an IBM PC AT with 4 megabytes of RAM and a 40-megabyte hard disk. Both IBM PC and Apple Macintosh interest areas are supported with public domain software and news and information.

For further information, contact:
John Edwards
Technical Coordinator
Computer Consultation Center
169 TMCB
Brigham Young University
Provo, UT 84604
(801) 378-7699

Instructional Science

The instructional science department uses the Macintosh in several of its course offerings. For example, CAI 580 (Development of Instructional Materials on Microcomputers for Computer-Aided Instruction) is a programming class that uses a Macintosh implementation of Pascal to teach fundamental programming concepts. Implementations vary from semester to semester: TML Pascal, Lightspeed Pascal, and Macintosh Pascal have been used to teach elements of the Macintosh interface—windows, menus, QuickDraw, and so on. In CAI 651 (Quantitative Reasoning), students use Macintosh computers in the Instructional Science Macintosh Lab to connect to campus mainframes running SAS and SPSS. CAI 780 (Advanced Computer-Aided Instruction) is a programming class in which students are expected to produce educational software for the Macintosh.

For further information, contact:
Paul Merrill
Instructional Science
201-B MCKB
Brigham Young University
Provo, UT 84604
(801) 378-7072

Physical Education Projects

The College of Physical Education has two AppleTalk networks. One, used in the college offices, connects six Macintosh Plus computers (three with LoDown 20 SCSI hard disks), a LaserWriter Plus, and two ImageWriter II printers, and is served by a Bernoulli Box 10+10 network server. The three hard disks will soon be connected to the network with TOPS, to make it possible to access any hard disk from any Macintosh. This net is used primarily for printer sharing, floppyless backup, and some data sharing for software development. The other network connects four Macintosh Plus systems that are used by the college programmers for software development.

A program to control inventory for the college is currently being developed. The College of Physical Education has hundreds of thousands of pieces of equipment. To better control and inventory this equipment, the program will use a bar code reader to read first the equipment user's student information from his student ID card, then the equipment ID (basketball, racquet, football, net) from printed bar codes in the equipment checkout room. The program will ask for the number of that specific item (basketball #23, racquet #15), allowing the immediate tracing of lost or damaged items. When an item becomes broken, a precise equipment usage report can be generated by the program to see how many hours (or days or minutes) that particular item has been used.

For further information, contact:

Bruce Holley
Chairman
Physical Education Services
112 RB
Brigham Young University
Provo, UT 84604
(801) 378-3994

Barry Jenkins
Competition Sports
1972 N. Main
Orem, Utah 84606
(801) 224-6834

YNET

Brigham Young University's central campus network (called YNET) connects 12 mainframe computers: six VAX 750s, two VAX 8600s, three IBM 4341s, and an NAS 9000. Specialized hardware and software enables many campus departments to use the Macintosh as a terminal to computers on YNET (among other things). Access to the mainframes is via a data switch that (when one of the IBM or NAS mainframes is requested) connects directly to a HYDRA 3270 protocol converter that converts ASCII character streams, allowing the Macintosh to emulate a locally attached 3270.

Specialized hardware and software enables many campus departments to use the Macintosh as a terminal.

VaxToPC and PCToVax are VAX file transfer programs that do data transfer between the VAX 8600 and personal computers. These programs can be used with MacTerminal 1.1, XModem, ASCII, and VTerm file transfer protocols. The KERMIT protocol is supported on all campus mainframes.

MacShare is an electronic-mail service provided on YNET for Macintosh enthusiasts. Any Macintosh-related information, rumor, or question is mailed electronically to MacShare. Network software distributes the message to all people on the MacShare distribution list. A message tells users that there is mail waiting for them the next time they log onto YNET (or immediately, if they are already logged on). And YNET is a part of BITNET, so BYU Macintosh users have almost instant access to other Macintosh users all over the world.

For further information, contact:

YNET:
Jim Eggett
Information Systems Services
167 TMCB
Brigham Young University
Provo, UT 84604
(801) 378-5025

PCToVax/VaxToPC:
Jim Logan
Information Systems Services
403 CB
Brigham Young University
Provo, UT 84604
(801) 378-6551

MacShare:
John Taylor
Harold B. Lee Library
3008 HBLL
Brigham Young University
Provo, UT 84604
(801) 378-6278

Workshops are taught in a specially built Macintosh lab.

IAS Lab

The workshops are taught in a specially built lab with 10 Macintosh computers. The lab is also available for individual rental (for as low as $1.00/hour bulk), and faculty can reserve it for use by their classes. Workshop instructors found that workshop attendees are often so fascinated by the Macintosh interface (Control Panel, Puzzle, clicking and dragging, and so on) that they neglect to listen to the instruction and go home no more proficient than they came, so a method was worked out to solve this problem: Now, one Macintosh is the master, and the other nine are slaves. The instructor has a panel of switches that control the video output of each slave. In this way, the instructor can "take over" the screen display of every slave (or selected individual slaves) so that students see exactly what is on the master's screen and don't "doodle." This also makes it easy for the instructor to demonstrate a certain concept, then give control back to the students to practice it on their own. The master has a video output port for projection onto a lab screen.

For further information, contact:
Harold Hendricks
Computer Teaching Services
2330 HBLL
Brigham Young University
Provo, UT 84604
(801) 378-2647

Library Word-Processing Center

The Harold B. Lee Library at Brigham Young University has a word-processing center that includes (among other things) six Macintosh computers and two LaserWriter printers. The computers and word-processing software are available to students and faculty for $1.50/hr. and LaserWriter printers for $3.00/hr. or 20 cents per page. They are quite popular: the printers average 15,000 pages apiece per month!

For further information, contact:
Scott Eldredge
Manager
HBLL Word-Processing Center
3361 HBLL
Brigham Young University
Provo, UT 84604
(801) 378-6723

Business School Lab
The School of Business runs a Macintosh Lab with Macintosh computers available to students currently enrolled in business courses. Basic software packages (such as MacWrite and Multiplan) are available for in-lab use.

For further information, contact:
Bob Kellett
School of Management
679 TNRB
Brigham Young University
Provo, UT 84604
(801) 378-6025

Honors Program Lab
The Honors Program operates a computer lab for honors students with several Macintosh computers and a LaserWriter printer.

For further information, contact:
Bob Kellett
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679 TNRB
Brigham Young University
Provo, UT 84604
(801) 378-6025

University of Chicago: A Case Study of Office Automation

Before the Macintosh entered the scene, there were problems in the admissions office.

Before the Macintosh entered the reception area at the University of Chicago College admissions office, the receptionist had a big problem. The receptionist's main tasks at the desk were to schedule interviews for prospective students with admissions counselors, mail out confirmations of those interviews, keep track of interview statistics, and handle a wide variety of telephone inquiries. The workload was not very heavy in terms of numbers of tasks, but each task required a good deal of the workday simply because of the cumbersome way it was handled. This made the duties tedious—and the receptionist pretty cranky.

Scheduling interviews was probably the worst job. The information for interview requests was recorded on tiny slips of scratch paper and then eventually transferred to a paper mock-up of the schedule. These pieces of paper were hard to handle. They were also far too easily lost, and when they were, the record of the interview request was also lost. If a student wanted to change the

time or date of his or her appointment, a mad shuffling of papers ensued. In addition, preprinted confirmation cards had to be filled out by hand for each interview.

The receptionist now has easy access to any of the interview information.

Using the Macintosh and the Double Helix program, we set up a data-base file that allowed all pertinent information to be entered into a screen created exclusively for that purpose. As a result, the receptionist now has easy access to any of the interview information. In particular, if a student needs to reschedule his or her appointment, the receptionist can make the necessary changes almost effortlessly, using the program's "quick query" function. In addition, a confirmation note can be written for a student using a template. With a certain selection, confirmation cards can be run either for individual students or for a particular time frame. The cards are set up so that the confirmation note appears on the left corner of a 4- x 9-inch card with the U of C letterhead. The name and address of the student is positioned to appear in an envelope window, eliminating the need to address the envelope. Confirmations are still personalized for each individual appointment, but the operation runs much more smoothly. Finally, lists of the interview requests for a certain time period can be run and then written into the schedule mock-up. All in all, the information is well organized, and the time and effort needed to perform these tasks are substantially reduced.

Before our Macintosh was installed, the receptionist kept a written record of interview statistics and then graphed it on paper in a simple dot-and-line formation. This type of document served the purpose, but did so with very little flair. Now, using the Excel program, the interview statistics are recorded on a worksheet and then used to create pie charts, bar graphs, and area graphs—all very impressive results. The statistics of past years have also been entered on worksheets, enabling the receptionist to create comparison charts of past and current information. The charts produced through the Excel program not only yield more precise statistics but also present them in a wider variety of chart types. This makes our dean very happy.

The Macintosh has also been hooked up to the office mainframe.

The Macintosh at the reception desk has also been hooked up to the office mainframe, allowing the receptionist to access a wide range of previously unavailable information. Consequently, she can give answers to a variety of questions that previously had to be handled by someone else. Having this information at her fingertips enables the receptionist to respond immediately to students and parents, eliminating the aggravation of waiting for answers. Telephone requests for applications used to be recorded on a form and then given to the processing office to enter into the mainframe. The receptionist is now able to enter the information as she receives it, thereby ensuring that the mainframe information is always up-to-date.

One daily problem at the admissions office is determining why a particular student has yet to receive his or her application. This problem is now easily solved. If an address is entered incorrectly, the receptionist can now correct it immediately. And if a packet has been sent to the correct address, but the student has still not received it, a new packet can be sent out immediately. In fact, any error in the record of a student's information can be corrected in the reception area as soon as it is discovered; it no longer needs to be written up and sent to the processing office for correction.

Finally, with the Macintosh in the reception area, the student's file can also be checked by the receptionist at any time during the application period to see if any of the required material is missing. This function was previously handled exclusively by the processing office.

For further information, contact:
Nancy P. Boyle
The University of Chicago
Office of College Admissions
1116 East 59th Street
Chicago, IL 60637
(312) 702-8650

University of Rochester: Physics Labs and the Macintosh

By Adam Konowe
Apple Student Rep

This report comes from research and personal experience on Macintosh use in the physics lab.

This report is the result of research and personal experience on the use of Macintosh computers in the physics labs at the University of Rochester. My desire to bring this subject to Apple's attention arose when I enrolled in PHY 181, the freshman physics lab here at Rochester. The programs discussed are actual programs in use at the university. The opinions expressed are those of lab technicians and in-house software writers. I have retained copies of the software programs for those who are interested. This report was originally given in the form of a live presentation, complete with software demonstrations, at Apple's regional office in Pittsford, New York.

Of the three programs being used for this lab, Cricket Graph by Cricket Software is the only one that is commercially available. It is useful because it is very general and can be shaped to fit some of the student's needs. It records data in a clear manner, displayed in a cell format. Data can then be transformed within the cells to

create relevant results (such as standard deviations and best values). Data accumulation is aided by features such as Simple Math and Transform, which allow the student to shape the data on the screen. This instantaneous display of information can be transformed into a graph using one of the many graph formats, which include rows, columns, pie, and polar. This screen graphing ability is valuable, because it allows the immediate verification of hypotheses. If a student wants to see whether an exponential relationship exists between Method A and Method B, he/she can use Cricket Graph to collect, analyze, and graph the data, thus proving his/her theory right or wrong. In addition, an option called Curve Fitting simplifies numeric calculations and verifies statistical accuracy (Poisson and Gaussian distributions). It does this by finding the formula that best fits the graph exponentially, logarithmically, and so forth, and displaying this formula, which the student can then use to test his/her accuracy.

The next program, the Lock-in-Four Demonstration Program, was developed in-house by the Department of Physics and Astronomy. It is used in conjunction with a lab on wave characteristics. The program demonstrates a variety of wave phenomena, to allow students to better understand the theories that they are about to test in the lab. A series of different kinds of waves scroll from right to left. Users can alter the phase shifts, distortion settings, and other variables that affect the shape and behavior of waves. When a setting is changed, the waves on the screen immediately react to this change. In conjunction with the lab, the program gives students a good template to work from and compare results to. When students record data based on the changes of wave behavior they have induced, they can see if such a result is logical.

The Macintosh can be hooked up to lab equipment for direct and instantaneous data acquisition.

The other in-house physics software package currently in use for this lab is MacAcq. It is a data acquisition program that allows the Macintosh to be hooked up to lab equipment for direct and instantaneous data acquisition. The bench control feature is used to tell the program what equipment you are using and how it is being connected. A separate hardware box connects between the Macintosh and the lab equipment. The information gathered can then be displayed in different formats. The Strip Chart displays the data in a constant strip chart format similar to that of an EKG machine. And the Pulse Height display shows cumulative data in a pulse height format that can display exact values of any coordinate on the X-Y graph. The advantage of this package is that it eliminates the need for the student to record data by hand and then type it into the Macintosh. MacAcq offers a more accurate and straightforward alternative, though special hardware may be necessary for such a hookup.

The Macintosh offers exciting prospects for higher education use, and enthusiasm for the machine is widespread. But more needs to be done to ensure its success and acceptance. According to my personal experience in the labs and interviews with the lab technicians, there is a need for more specialized software. For example, statistics programs only do statistics, and Cricket Graph cannot

handle important scientific tasks. Programs designed for the laboratory and the special problems that are part of the lab just do not exist. It has been suggested to me by an in-house software developer that part of this problem could be eliminated with a greater amount of software development seminars for higher education personnel. Presently, it takes too long to learn to program the Macintosh on one's own. The writers and users are enthusiastic about the potential of the Macintosh, but they need help. Additional support from Apple would help the developers in their efforts to expand the use of the Macintosh in the higher education market.

Programs designed for the special problems of the lab just do not exist.

I have retained copies of MacAcq and Lock-in-Four for those who are interested in further information on these programs. I can also help with more general questions regarding Cricket Graph and other applications for the Macintosh.

Thanks to Mark Semans and Dan Ruggiero of the physics and astronomy department for their assistance and comments.

For further information, contact:
Adam Konowe
(914) 941-2701
AppleLink: ST0037

Drexel University: Macintosh Computers

Problem: Need to provide more than 30 departments on campus with access to the administrative data base.

Solution: Use some of the 11,000 Macintosh systems on campus, and take advantage of the powerful terminal software available to minimize the number of commands a user needs to memorize.

The Systems and Procedures Group of the Office of Computing Services implemented the Student Record System (STURECS) in the fall of 1986. It is now time to permit some of those administrative and academic offices (secondary users) to gain access to STURECS. STURECS was developed in the Model 204 database-management system on an IBM 4381-13 running VM/CMS.

Drexel University's administrative offices have been using Macintosh systems for several years for routine word processing and record keeping. Since most offices already had Macintosh computers, an access solution that would make use of existing equipment was desired. The secondary user project under development involves the use of a Macintosh running pcLINK from

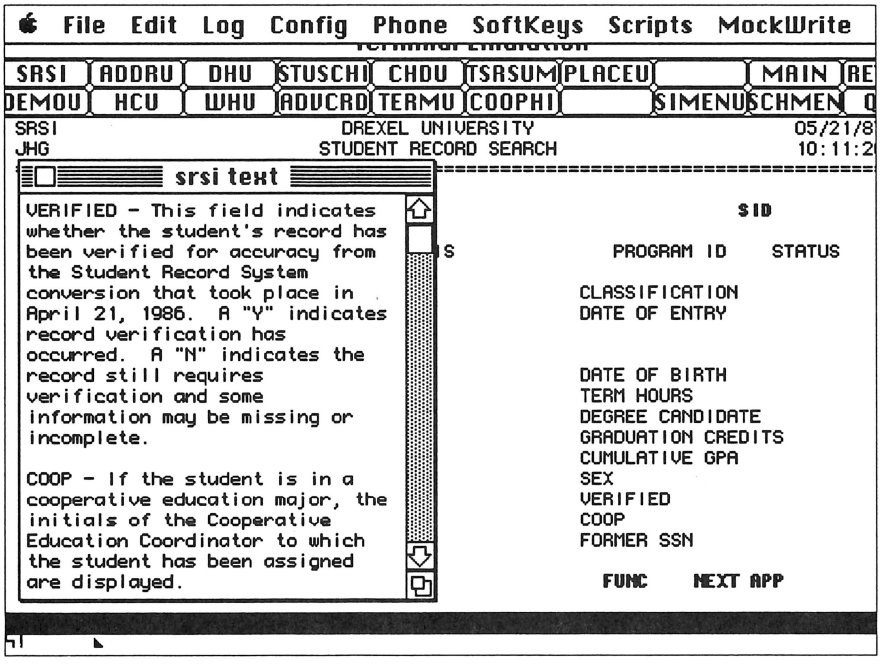
Pacer Software into an IBM 7171 protocol converter. The Macintosh emulates a VT100 terminal to the 7171. pcLINK offers "softkeys" and "scripts," which permit the development of elaborate macros for each of the screens accessed in STURECS. These macros are displayed at the top of the screen. The user just clicks on the desired command. As each screen is entered, a new set of softkeys can be brought up for use.

When used as a terminal, the Macintosh can provide on-line help.

Another advantage of the Macintosh as a terminal to access the student record system is the ability to provide on-line help for users who are confused about the commands or don't understand how to interpret the data presented by the system. MockWrite is used to present a text-only version of the user manual, which was developed in MacWrite. MockWrite permits searching within the help document for a particular word or command.

Since MockWrite is installed on the disk, users can also copy entire screens or sections of screens and paste them in a blank page of MockWrite. This permits the creation of reports that can be printed while the Macintosh is still connected to the system.

In this section from a pcLINK screen, you can see some of the softkeys at the top of the screen. There is also a MockWrite window displaying help related to fields within the STURECS record displayed.



This project will be refined during the summer.
For more information, contact:
John Gregory
(215) 895-1843 AppleLink: A31

Heidelberg Statistical Laboratory

The Institute of Applied Mathematics of the University of Heidelberg has established a statistical laboratory (StatLab), which is used for teaching and consulting.

The StatLab is building a public domain library of statistical subroutines using results from current research in mathematical statistics.

The library includes:

- Standard statistical subroutines.
- Implementation of recent statistical methods.
- Sample programs and demonstrations for educational purposes.

The subroutines are written in Pascal, based on an extended precision arithmetic (IEEE Standard 754/Draft), and will run on Apple Macintosh or Lisa® personal computers.

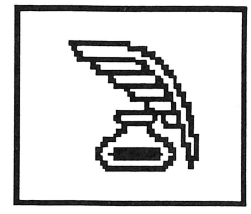
The current release contains about 50 procedures or functions, including the classical probability functions and inverse probability functions (Gaussian distribution, c^2-distribution, Fisher's F distribution, Student t distribution, beta distribution); correlation, t-, F-, and c^2-tests; Shapiro-Wilk's test; and distribution independent procedures (randomization tests), as well as demonstration programs and implementations of recent statistical methods.

The current release contains about 50 procedures or functions.

All routines have been tested under TML Pascal, using Apple's SANE™ package.

For further information, contact:
Dr. G. Sawitzki
Statistisches Praktikum
Institut für Angewandte Mathematik
Universität Heidelberg
Im Neuenheimer Feld 294
D-6900 Heidelberg
Germany

News and Notes



The **News and Notes** section contains information of general interest to those in the Macintosh community. If you have information or know about events that you feel fit into this category, please send your news along.

EDUCOM

EDUCOM is a nonprofit consortium of colleges, universities, and other institutions facilitating the introduction, use, and management of information technology in higher education. EDUCOM provides a forum for the exchange of ideas on computer applications for all aspects of academia: teaching, research, administration, and communication.

EDUCOM provides a forum for the exchange of ideas on computer applications for all aspects of academia.

One of the focuses of EDUCOM revolves around software issues. The EDUCOM Software Initiative (ESI) addresses the development, distribution, and use of software in higher education. Through active collaboration of EDUCOM members and corporate associates, the ESI has formed a set of task groups and begun a variety of projects and publications.

The current task-group emphases are as follows:

- Academic Software Development, chaired by Jerry Sprecher from California State University.
- Incentives and Criteria for Development of Quality Academic Software, chaired by Bob Kozma from the University of Michigan.
- Software Information Resources, chaired by Peggy Seiden from Carnegie-Mellon University.
- Institutional Software Licenses, Contracts, and Intellectual Property, cochaired by Diane Balestri of Princeton University and Casey Green of UCLA.
- Managing Software Acquisition and Support, chaired by Mary Grace Smith from Harvard University.

- Research on Educational Impact of Information Technologies, chaired by Peter Lyman of Michigan State University.

- Dissemination/Promotion/Marketing of ESI Outcomes, chaired by Susan Saltrick, John Wiley & Sons, Inc.

Out of EDUCOM efforts has come a statement of principle about intellectual property and legal and ethical use of software.

Out of the EDUCOM Software Initiative efforts has come a statement of principle about intellectual property and the legal and ethical use of software. This "code" is intended for adoption and use by individual colleges and universities. The statement is as follows:

Software and Intellectual Rights

Respect for intellectual labor and creativity is vital to academic discourse and enterprise. This principle applies to works of all authors and publishers in all media. It encompasses respect for the right to acknowledgment, right to privacy, and right to determine the form, manner, and terms of publication and distribution.

Because electronic information is volatile and easily reproduced, respect for the work and personal expression of others is especially critical in computer environments. Violations of authorial integrity, including plagiarism, invasion of privacy, unauthorized access, and trade secret and copyright violations, may be grounds for sanctions against members of the academic community.

Brown University has already formally adopted this code. It is being posted in user areas around campus and will be included in the *Brown Student Handbook*.

New ethical and legal issues are emerging along with the technological ones.

The EDUCOM Software Initiative plans a campaign to increase awareness in higher education of important issues about intellectual property and software use. The rising availability of new information technology and organization systems is changing the ways in which many forms of intellectual property—not just software—are being handled. New ethical and legal issues are emerging along with the technological ones, and the higher education community will be expected to provide leadership in dealing with these issues. The publishing and software industries should be able to look to educational institutions as models for handling ideas without compromising the integrity of either those who create them or those who build on them.

If you are interested in participating in an ESI Task Group, contact:

ESI
EDUCOM
P.O. Box 364
Princeton, NJ 08540

The Costs and Consequences of Software Piracy

By Kenneth C. Green and Steven W. Gilbert

College students are a poor market for software due to piracy and the proliferation of student-written programs.

The Wall Street Journal,
July 10, 1986, page 1

The *Journal* is wrong. The college market, including students, faculty, administrators, and staff—as individuals and as institutional purchasers—is a viable and growing market for computer software and related products and services. The nation's microcomputer software companies, including the industry's leaders (Ashton-Tate, Lotus Development Corp., and Microsoft Corp.) are beginning to negotiate site agreements with colleges across the country. These companies and others, as well as ADAPSO, one of the major trade associations representing the computer industry, have become actively involved in a new academic Software Initiative sponsored by EDUCOM, a nonprofit consortium of some 500 colleges and universities.

The college market is a viable and growing market for computer software.

Over the past 18 months, many institutions have begun to respond to vendors' concerns about software use (and abuse). Preliminary results from a 1986 survey conducted jointly by Peat Marwick and EDUCOM (in cooperation with the *Chronicle of Higher Education*) of the EDUCOM member-institutions reveal that more than half of the responding campuses have written policies on computer access and unauthorized software duplication; two-thirds have campus policies on illegal copying and unauthorized computer access.

Institutional officials responsible for acquiring and managing microcomputer software are looking for ways to reduce illegal and unethical copying. Three issues motivate this search. First, faculty and administrators acknowledge that colleges and universities have a moral responsibility to promote legal and ethical behavior with respect to computer software. This falls within the long-standing academic tradition of respect for authorial and creative rights related to various forms of intellectual property, such as the expression of ideas, writing, patents, and works of art.

Officials are looking for ways to reduce illegal copying.

Second, campus computer center managers and others responsible for purchasing or managing microcomputer software recognize that their ability to negotiate contracts with software producers is undermined by evidence of inappropriate copying on their campuses. They recognize that their institutions must demonstrate positive steps to reduce illicit copying, if they hope to negotiate favorable discounts and site agreements with software vendors.

Although no campus has yet been sued for illegal use of software, we fully expect such a lawsuit soon.

Finally, college and university administrators worry about potential institutional liability for software abuses committed by individuals affiliated with their institutions. While institutional legal liability for the activities of individual students or faculty is not yet clear in many cases, it is likely that the risk of such liability can be substantially reduced by "good faith" efforts to control illegal copying. Although no campus has yet been sued for the illegal use of microcomputer software, we fully expect such a lawsuit sometime soon. Industry sources tell us that ample evidence for one possible suit is already in hand. Based on previous suits filed against corporations, the potential liability and damages in this case could run into millions of dollars.

Although many students and faculty members are writing useful (and, in many instances, professional-quality) programs, their efforts will never fulfill the campus need for commercially developed generic software tools such as word-processing, spreadsheet, graphics, data-management, communications, and outlining/ "thought-processing" software. Consequently, the *Journal*'s assessment that student-authored software is a substitute for commercial software products is wrong. (A discussion of the important and emerging role of quasi-commercial software developed by faculty members is beyond the scope of this article.)

Unfortunately, the *Journal*'s statement about software piracy—given prominent visibility in the nation's leading business newspaper—sends a powerful message to the nation's software companies and business sector. The message is that college students and faculty do not respect intellectual property. And this should concern all of us in the higher education community.

Higher education has strong traditions involving respect for intellectual property.

In higher education, we have strong traditions involving respect for intellectual property. It is essential to the conduct of our most important activities and to the mission of our institutions. We do not tolerate the theft of property or ideas, nor do we condone plagiarism. We demand that individuals preparing research papers and other publications clearly identify the influence of others' ideas and findings.

Admittedly, some of us engage in some transgression of the letter (but, hopefully, not the spirit) of the copyright laws in our professional lives. Occasionally, we succumb to the expedience of copying journal articles rather than writing to authors for reprints. But most of us would not think of copying a book instead of buying it. However, many students and faculty seem to view electronic media (software as well as records, audiotapes, and video cassettes) as different from printed materials.

Software piracy is not a new problem—and it is not confined to academic institutions. Software companies have sued major corporations to recover damages for unauthorized duplication. In an angry and open letter written in 1976 to the early computer enthusiasts who ultimately made BASIC the early standard programming language for microcomputers, Bill Gates, then a young

computer prodigy and now chairman of Microsoft Corp., wrote that "the amount of royalties [Paul Allen and I] have received from sales to hobbyists makes the time [we spent developing BASIC for the ALTAIR, the first microcomputer] worth less than $2 an hour...Why is this? As the majority of hobbyists must be aware, most of you steal your software. Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid?"

Unfortunately, many in the software industry feel strongly that the academic community behaves like the hobbyists who used and liked—but never paid for—the early version of BASIC.

In the final analysis, the issue almost always comes down to cost.

We know the usual arguments about why illegal duplication and "software piracy"—although wrong—may be condoned on some campuses. We have heard faculty members and administrators argue that software is overpriced. We have had long arguments with faculty who do not understand or will not accept the notion of intellectual property rights. Yet, in the final analysis, the issue almost always comes down to cost: most campus users claim (perhaps with some justification) that they simply do not have the funds to buy top-quality commercial software at current prices. The irony, of course, is that campuses (and individuals) budget for the costs of hardware but frequently underestimate the costs of software and user support. And, clearly, the potential campus bill for software can escalate rapidly from hundreds to hundreds of thousands of dollars when viewed in terms of supplying software to all faculty (and possibly students).

Illegal copying costs everyone.

Illegal copying costs everyone. Some industry observers estimate that the number of illegal or unauthorized copies of various software programs approaches the total number of legal copies. Piracy deprives software authors and publishers of payments and royalties, part of which would be reinvested in product development and enhancement. It also contributes to higher software prices as developers and publishers factor in a "piracy cost" in pricing their new products. Equally important, illegal copying may deprive the academic community of the new software we want for instruction and research: if software developers find they cannot obtain a reasonable return on their investment for campus-oriented products because of the piracy problem, they will simply refuse to develop software responsive to the needs of campus-based users.

Can campuses control illegal copying? Is there some way for campus users and software providers to find a middle ground that reduces costs to users, yet provides a reasonable profit to software developers?

Yes. And it is important for both the campus and vendor communities that the solution(s) emerge soon. Some already exist, while others are under development.

First, each college and university must accept part of the responsibility for educating its constituents about the conditions under

Each campus must accept responsibility for educating users about when copying is illegal.

which copying software is (and is not) appropriate, ethical, or legal.

Second, campuses should view and treat illegal copying as a form of plagiarism or theft. Many institutions have already established a "Code of Conduct for Computing," similar to campus honor codes, governing the use and abuse of computer resources. These campus codes provide clear statements about both appropriate use and likely sanctions for inappropriate behavior.

On a broader scale, one aspect of the EDUCOM Software Initiative will promote institutional adoption of a code—a statement of principles on software and intellectual property. The EDUCOM Code seeks to promote self-regulation, a key issue for the campus community. Although the actual implementation of these policies would vary from campus to campus, the code itself provides a broad statement regarding software as a form of intellectual property and a campus commitment to discourage any abuse of copyright laws as they apply to software.

Third, campuses should seek site agreements with software vendors. Site agreements—including prices and terms for reproduction rights and discounts on volume sales for the institution—offer a viable alternative that can help reduce software costs and the administrative headaches associated with managing campus use. Site agreements also help promote the development of software standards for a campus and thus reduce the potential for the proliferation of incompatible software across the institution.

Software producers want to do business with colleges, but only if institutions demonstrate that they are responsible.

Commercial software producers and publishers are interested in and increasingly sensitive to the needs of the college market. They want to do business with colleges, but only if institutions demonstrate that they are responsible clients. Given higher education's hopes and aspirations for the "computing revolution," increasing the quality and accessibility of software is a top priority. This will happen only if colleges and universities act as responsible users, and software providers offer workable pricing and distribution alternatives.

Kenneth C. Green is the associate director of UCLA's Higher Education Research Institute. Steven W. Gilbert is a managing director of EDUCOM and directs EDUCOM's Software Initiative and Corporate Affiliates Programs. This article originally appeared in *Change*, Vol. 19, no. 1, pp. 46–50, January–February 1987. Reprinted with permission of the Helen Dwight Reid Educational Foundation. Published by Heldref Publications, 4000 Albemarle Street, NW, Washington, D.C. 20016. © 1987.

New Macintosh Applications in the Academic Courseware Exchange

The spring 1987 issue of the *Kinko's Academic Courseware Exchange Catalog* is now available. The number of titles listed in the catalog has increased from 65 to 102, and there are now 68 courseware packages for Macintosh.

Kinko's software can be ordered by mail, by a visit to a Kinko's Copies store in your area, or by telephone. The toll-free numbers are 800-235-6919; in California, 800-292-6640; and outside the United States, 805-967-0192.

If you are interested in developing or distributing your courseware through the Academic Courseware Exchange, call for a free, no-obligation Developer's Package. The Developer's Package includes all of the information you need to include your courseware in the Academic Courseware Exchange.

If you are interested in distributing through the Academic Courseware Exchange, just call.

The following is a list of the new Macintosh titles, with a brief description of each:

- **MacLang**—MacLang is a foreign language and ESL authoring tool. It can be used to create exercises in a variety of formats, from basic drills to activities that place the language skills in context. The system also features the ability to include graphics in the exercises, as well as an audio interface to improve listening comprehension.

  MacLang's exercises can be constructed for students of French, Spanish, Italian, Portuguese, German, Rumanian, Russian, and Greek.

- **Oyster**—Oyster is an authoring system that creates stand-alone exercises in all subject areas. It allows the use of text and graphics and includes a rich branching structure. It is based on an outline that automatically keeps track of the author's logic in creating the exercise and so makes possible analytical exercises that teach the process of thought itself.

- **Energetics and Metabolism, Garden of Biology: Volume I**—The Garden of Biology series is intended as an illustration and aid for people who have some knowledge of biology but would like access to more detail than they can easily recall. The disks are designed to be used along with one or more texts or courses. The three subareas included on the Volume I disk are Life, Organisms, and Diversity.

- **Evolution, Garden of Biology: Volume 2**—Another in the Garden of Biology series, it includes six subareas of information: Cosmos, Earth, Life, Organisms, Diversity, and Species.

- **KSIMS**—KSIMS is a simulation for determining the rate law and reaction rate of a chemical reaction.

- **PeriChart**—PeriChart is a data base of atoms and elements that can be searched easily through interaction with an electronic display of the periodic chart. Pull-down menus enable the user to manipulate the data and to select practice exercises for learning basic nomenclature and positioning within the periodic chart.

- **Vocabulary Drill**—This is a vocabulary exercise to accompany the study of chapters 16 through 25 of McKay's *A History of Western Society*.

- **Create**—Create is a prewriting program designed to stimulate ideas about the direction a document should take to achieve its purpose. It helps users to narrow a topic, focus on a specific audience, and determine the purpose of a document.

- **Harris v. Klondike Klimber, Inc.**—This is a series of nine tutorials that lead the student through the preparation of a products liability lawsuit. It ranges from the initial client interview through analysis of principles of negligence and products liability—accessing the client's case—and ends with a review of applicable damage questions.

- **Torts Exercises**—The 13 torts exercises in this package explore the principles of tort law and aid in the development of legal reasoning by presenting questions with alternative answers.

- **BERTIE - II: A Symbolic Logic Tour**—This is a program for teaching natural deduction. It checks derivations in sentential logic and predicate logic, verifying that formulas are well formed and inference rules correctly applied.

- **MindLab**—MindLab is a system for creating, editing, and running cognitive psychology experiments in perception and cognition on the Macintosh.

Drexel Celebrates Software Royalties

On May 7, 1987, Drexel University celebrated its first annual presentation of royalties to faculty and student software developers. Fifteen faculty members and students were honored at a reception at which they received their royalty checks from the Kinko's Academic Courseware Exchange. The reception was

hosted by the Drexel administration, and its purpose was to recognize and celebrate these software development accomplishments. Keith Lawrenz from Kinko's, and Katie Povesjil and Ken Rosen from Apple, were on hand to congratulate recipients and join in the celebration.

This was the first such royalty payment received by Drexel faculty for software development, and offers a strong incentive to others—both faculty and students—to engage in courseware creation activities. The royalties were earned by the sale of some 1,200 courseware packages through Kinko's. The strong support shown by Drexel's administration and its policy of allowing students and faculty to earn royalties for their efforts, is very positive in giving the entire software development effort an increasingly important role on the university campus. The receipt of the royalties represents the completion of the "circle" in the courseware development process and establishes another area of intellectual and pedagogical creativity and productivity.

Drexel currently has 17 courseware products available through Kinko's, with 10 more on the docket for the next catalog. Kinko's Academic Courseware Exchange has greatly increased the number and variety of products available at very reasonable prices for the educational community. Kinko's performs a valuable service by enabling the entire educational community to share courseware products at a reasonable cost, but still allowing universities and developers to recoup some of the substantial investment made to produce educational software.

The Annenberg/CPB Project

The Annenberg/CPB Project was created in 1981 to apply telecommunications and information technologies toward improving the quality and accessibility of higher education. With funding of $10 million a year for 15 years provided by the Annenberg School of Communications to the Corporation for Public Broadcasting, the project seeks to develop course materials, tools, and delivery systems that increase opportunities for those who wish to obtain a college-level education. To achieve that end, the project provides funds to develop innovative, academically rigorous course materials and to explore new applications of electronic technologies. These technologies include broadcast television and radio, videotape and audiotape, stand-alone and/or networked computers, videodisc, compact disc, and any combination of these, as well as other newly developed technologies.

Demonstration Projects

Projects help educators explore the implications of the technology for enhancing learning and teaching.

Demonstration projects sponsored by the Annenberg/CPB Project are intended to help educators explore the implications of the technology for enhancing learning and teaching. They explore alternative ways to conceive of the aims and content of education, make learning more accessible, and experiment with new approaches to teaching.

The Annenberg/CPB Project reviews a wide variety of proposals, and the result is a rich and diverse collection of projects, most of which are listed in the following pages. Some of these efforts have also begun to reinforce one another. For example, MIT, PICS, PERSEUS, and a video course called "French in Action" all work with videodisc and contribute to a reconceptualization of teaching and research about foreign languages and cultures. Several other projects are exploring complementary approaches to the teaching of writing.

Other projects shed a little light on the technologies of learning. For example, many of the projects explore ways in which pictures and motion can complement text. Others are developing multi-dimensional documents, some under the rubric of "hypertext," others called "computer conferences." Early results suggest that a hybrid form might have advantages for teaching and computer-supported cooperative work. And two projects are exploring ways in which computers can enhance communication even when learners and experts are in the same room.

The following are descriptions of some of Annenberg/CPB's demonstration projects:

- **MIT** is working with artificial intelligence, interactive video, and audio applications to develop prototype resources for teaching five languages.

- The **PERSEUS** Project at Harvard and Boston Universities is creating an experimental version of a text and visual data base on classical Greece, plus a method for creating assignments and courses that can help students learn to exploit this vast library of primary source material. PERSEUS will probably be stored on CD-ROM and videodisc.

- **Brown University's Intermedia** prototype allows faculty and students to work with text, graphics, and music, and to use other electronic media to create associations between different kinds of information (for example, linking a sentence in a text to an element of a picture or to data in a data base.) Experimental materials have been developed for courses in literature and plant biology.

- The **University of Nebraska** has developed prototype laboratory experiments on videodisc to test their effectiveness as alternatives to traditional wet-labs.

- The **PICS Consortium** is importing foreign-language television programs to repackage on cassette and videodisc for teaching foreign languages and international studies.

- **Writers Writing** is a set of three videotaped case studies and accompanying print materials that illuminates the process by which professional writers work. It is an experiment in supplementary use of video.

- The **University of California at Irvine** is developing pilot lessons to test the feasibility of a microcomputer-based precalculus course.

- **University Tech-Tel** is developing a new calculus course that will test the capabilities of live voice-data conferencing for distance education.

- The **National Narrowcast Service of PBS** is a service offering specialized full courses and short seminars directly to learners at their worksites.

- The **University of South Florida** has tested the advantages of supplementing a television-based course with electronic mail.

- The **New Jersey Institute of Technology** is creating a new computer conferencing system with specific capabilities for supporting distance education, including new options for faculty and the ability to store graphics.

- The **Electronic Text Consortium,** headed by **San Diego State University,** has tested the potential of electronic text to deliver full courses and supplementary material, and prepared 10 analyses of educational developments in the field.

- The **EDUCOM Software Initiative** is a consortium of individuals and organizations, including representatives from colleges and corporations, that is developing a variety of strategies to increase the availability of high-quality interactive instructional materials.

Course Collection

Courses in many disciplines have been created with the support of the Project.

Since 1981, courses in many disciplines, utilizing a wide range of technologies, have been created with the support of the Project. As these become more available, they illustrate ways that creative application of technology can offer students access to outstanding teams of teachers, an unprecedented range of information, and new opportunities to interact with faculty and other students. They demonstrate that access and quality can be mutually reinforcing

goals, capable of providing rewarding opportunities for both traditional and nontraditional learners.

The available video and audio courses cover a wide range of discipline areas and subjects. Each course includes a series of video and/or audio programs, accompanied by one or more texts, a study guide for students, and a faculty/administrator guide. The courses can be used as complete credit courses, as supplementary materials, in continuing education programs, as discussion tools for special-interest and community groups, as additions to library audio and video collections, and as resources for teacher in-service programs.

The following is a listing of a few of the courses now available from the Annenberg/CPB Project:

- **Brain, Mind, and Behavior**—This course explores the role of the brain in vision, movement, sleep, learning, language, mental disease, aging and memory, and addiction, as well as several other topics. The world's leading scientists convey the latest in brain research and its bearing on our understanding of human psychology.

- **Planet Earth**—Video programs and text (plus Macintosh simulations now under development) trace the formation of the solar system and evolution of the earth, leading students through the current theories concerning the earth's layers, continents, resources, and climate.

- **The New Literacy: An Introduction to Computers**—This is an overview of what a computer is, how it operates, and what it can and cannot do. It is an introduction to the field of computers—systems design and programming, data communications, office automation, microcomputers, computer files, and data bases.

- **The Write Course**—This is an approach to writing skills that leads the student through the many stages of the writing process—prewriting, drafting, revising, and editing—with practical advice from contemporary authors.

- **French in Action**—This two-semester course uses an original romantic comedy filmed on location in France to provide an in-depth introduction to French language and culture. Entirely in French, story episodes are illuminated by a variety of images drawn from the French-speaking world, and extensive audio and print materials.

If anyone wishes to receive more information on the courses, demonstration projects, or research studies available from the Annenberg/CPB Project, please contact:

The Annenberg/CPB Project
1111 Sixteenth Street, N.W.
Washington, D.C. 20036
(202) 955-5251

Guidelines for proposals to the Annenberg/CPB Project can also be obtained at this address.

Many thanks to Dr. Stephen C. Ehrmann, program officer for Interactive Technologies at the Annenberg/CPB Project, for materials contributing to this article.

Oregon State University: MacHack West

On September 23–25, Oregon State University, Corvallis, Oregon, will host MacHack West. The Conference will be held in the school's LaSells Stewart Center.

Wednesday
7:00 P.M.
Registration, Social, and Facilities Open House

Thursday
8:00 A.M.
Continental Breakfast and Welcome

9–10:15
Concurrent Sessions:
- Selecting a Development System
- Introduction to Object Pascal
- The Macintosh II, Part 1
- Introduction to Desk Accessories
- Introduction to the Macintosh

10:30–12:00 NOON
Concurrent Sessions:
- MPW, Part 1
- MacApp™ Part 1
- The Macintosh II, Part 2
- Advanced Desk Accessories, Part 1
- Introduction to Macintosh Programming

Whether you're interested in applications, desk accessories, or networking, MacHack has something for you.

12:00–1:30 P.M.
Lunch

1:30–3:00
Concurrent Sessions:
- MPW, Part 2
- MacApp, Part 2
- The Macintosh II Compatibility Issues
- INITS
- Programming the Macintosh, Part 1

3:15–5:00
Concurrent Sessions:
- MPW, Part 3
- MacApp, Part 3
- The Macintosh II Color Graphics Drivers
- Programming the Macintosh, Part 2

5:00–7:00
Open Lab and Social

7:00
Banquet—Keynote Speaker: Steve Wozniak

Friday

9:00–10:15 A.M.
Concurrent Sessions:
- Advanced MPW, Part 1
- Networks, Part 1
- A/UX™, Part 1
- Advanced Drivers, Part 1
- Programming the Macintosh, Part 3
- Software Documentation

10:30–12:00 NOON
Concurrent Sessions:
- Advanced MPW, Part 2
- Networks, Part 2
- A/UX, Part 2
- Advanced Drivers, Part 2
- Programming the Macintosh, Part 4
- Software Marketing

12:00–1:30 P.M.
Lunch

1:30–3:00
Concurrent Sessions
Advanced MPW, Part 3
Communications
A/UX, Part 3
Advanced Desk Accessories, Part 2
Selecting a Development System
Software Distribution
3:00
Closing Picnic

The Macintosh Lab will be open 24 hours a day during the conference for software swapping and hands-on experience. A free disk of software worth more than the registration is available for all participants.

A free disk of software is available for all participants.

Registration fees: Participant—$75 before August 20; $125 after August 20
Student—$35
Vendor—$100 plus participant registration fee

Registration and extra banquet tickets ($15) are limited to available space.

Housing: At Hawley Hall, $15/night single, $10/night double

For more information, contact:
MacHack
Department of Computer Science
Oregon State University
Corvallis, OR 97331
(503) 754-3273

University of Nebraska at Lincoln: Macintosh and Composition

The University of Nebraska at Lincoln will be hosting a conference on Macintosh use for writing instruction November 13–14. The conference, Rewriting the Writing Curriculum, is intended to serve several functions:

- To share what we've learned in our composition classes about using Macintosh computers.
- To specify the kind of hardware and software we envision for the future precisely enough that we can request its development.
- To plan for a much larger conference in 1988.
- To caucus for the next CCCC.

The conference will produce a planning group for future Macintosh use in the teaching of composition.

This conference will produce a core planning group for future Macintosh use in the teaching of composition. In addition to composition faculty members who use Macintosh computers, we would like to have representatives from the computing resource centers that support us. Because we conceive of the conference as a working body, we've chosen to organize it into workgroups of about eight people each. Sessions will cover:

- Hardware and software
- Teaching strategies
- The politics of computer-based writing instruction

There will be hands-on demonstrations, and you are encouraged to bring anything that you use or that you've developed and want to share. We need group leaders for these sessions, and invite you to volunteer in an area in which you have special expertise; if you volunteer, please append a brief paragraph to your application describing your background in that area.

The conference fee will be $35. For registration materials or further information, please contact the conveners:

Steve Boyd
Department of English
University of Nebraska
Lincoln, NE 68588-0333
AppleLink: U0128
BITNET: SBOYD@UNLVAX1

Nancy Kaplan
174 Rockefeller
Cornell University
Ithaca NY 14853-2502
(607) 255-4234
AppleLink: A24

Please pass this information on to anyone you think might be interested. We look forward to seeing you at the conference.

Information Technology in the Health Sciences

The second Information Technology in the Health Sciences conference was held May 13–15 in Memphis, Tennessee. It was attended by doctors, faculty, and staff from major medical schools around the country. Sponsored by Apple Computer, Inc., and hosted by

the University of Tennessee at Memphis, the conference was very successful—the wish expressed most often was for more time in which colleagues could talk with each other informally and for more time to attend all of the sessions.

The wish expressed most often was for more time to talk informally.

Presentations were given by representatives of third-party software companies, Apple Computer, faculty and staff from the medical schools, and faculty involved in other aspects of Macintosh computing that are applicable to the health sciences. There was also a hands-on room in which attendees could meet, share ideas, and use various software packages.

The following is a recap of the agenda and presentations:

- **James C. Hunt, M.D., Chancellor of the University**
  Project MacNificent and the University of Tennessee
  Dr. Hunt described how the University of Tennessee at Memphis is spearheading efforts to make the body of scientific information necessary for scientists, health care professionals, and students more available and accessible. In doing so, the school is implementing a campus Information Transfer System, which involves making the Macintosh family of computers available to all students, staff, and faculty and expanding its network (UT Memphis NetOne) to link 12 sister colleges and universities and 7 major Memphis Medical Center Teaching Hospitals.

- **Douglas H. McConnell, M.D., F.A.C.S., UCLA School of Medicine**
  Building Tomorrow's Medical Information System
  Dr. McConnell spoke about the need for a graphics-based system at patients' bedsides to capture the medical process involving patient, nurse, and physician. This would allow the process and accompanying decisions to be coded into the CORE code of medicine, enabling a compact, transferable, and readable patient record to be produced and read by any CRIS system.

- **Dr. Chris Minion, Iowa State University of Science & Technology**
  Scientific Presentations: Posters, Slides & Publication Graphics (hands-on demo)
  Dr. Minion presented tips and techniques for successful production of scientific posters, 35mm slides, and publication-quality graphics. All aspects were covered, including software used, graphics production and organization, legends, audio-visual hints, ideas for types of film to be used, and size of images and readability.

- **Thea Tlsty, Ph.D., University of North Carolina, Lineberger Cancer Research Center**
  Using the Macintosh in the Laboratory
  Dr. Tlsty discussed the many ways that she and her staff are using the Macintosh in the lab—for both research and productivity. Macintosh is used for word processing, accounting, inventory, drawing information from outside medical data bases, sending proposals, graphing, and gathering and analyzing data.

- **Naomi Broering, Biomedical Research Center at Georgetown University**
  M&M's: Mac Meets Mini-Medline
  Broering's presentation demonstrated the use of Macintosh in data transfer of bibliographic information in the preparation of scholarly publications. The miniMEDLINE SYSTEM can be accessed by users at the Georgetown University Medical Center through a local area network on Macintosh computers. The miniMEDLINE data base is stored on the medical library's DEC PDP 11/44 minicomputer, and contains the latest three years of 460 journal titles and abstracts. It requires about 700 megabytes of disk storage.

- **Steve Brown, University of California at Santa Barbara**
  Chet Grycz, University of California at Berkeley
  Professional Publishing
  Steve Brown and Chet Grycz showed how the Macintosh is incorporated as a graphics tool in preparing visuals for faculty needs, illustrations for journal publication, slide generation, poster ideas, brochures, book design, and scholarly publishing. They also discussed hardware tools, output resolution, and networking issues.

- **Robert Markison, M.D., University of California at San Francisco**
  A Mac in Hand, Teaching Hand Surgery with the Macintosh
  Dr. Markison discussed how his school uses the Macintosh for the diagnosis and treatment of physicians' hand problems, as well as a patient-centered type of teaching for medical students and residents.

- **Tony Parisi, Ph.D., Wright State University**
  Roger Siervogel, Ph.D., Wright State University
  Ten Days to Computer Literacy: A Unique Approach That Works
  Computer literacy is an important aspect of medical education and should be included in any medical curriculum. Drs. Parisi and Siervogel discussed the computer literacy program at Wright State University. The unique aspects of this program include computer checkout to students and dedicating a block of time to attaining a very high level of computer literacy. The Macintosh has played a critical role in the success of this program.

- **David R. Gastfriend, M.D., Harvard Medical School**
  Design of a Macintosh-Based Physician's Workstation for Real-Time Interactive Clinical Data Base Management.
  In this session, Dr. Gastfriend proposed a design for a Physician's Workstation that would meet physicians' informational needs. A Macintosh would interface with a host clinical data base to offer rapid data entry, controlled data quality, non-linear access to record and applications modules, graphic representation of file structure and environment, and a gateway to integrated decision assistance resources, providing context-specific consultative feedback in the midst of physicians' decision making.

- **Phil Bushby, D.V.M., Mississippi State University**
  Information Explosion
  Dr. Bushby explained how the Macintosh is a necessary tool for medical students to manage the profusion of medical information available to them. In the veterinary curriculum, the Macintosh extends the power of the mind through applications such as Computer-Aided Diagnostic, Computer-Aided Patient Management, and Computer-Assisted Health Maintenance Programs. Dr. Bushby summarized three years' experience using Macintosh in the Mississippi State University Veterinary School curriculum.

- **Thomas Abdella, M.D., University of Tennessee Memphis**
  Presentation Graphics on the Macintosh (hands-on demo)
  Dr. Abdella conducted a hands-on session using the Macintosh for creating presentation graphics. Students at the University of Tennessee at Memphis receive hands-on instruction from the beginning of their program. Courses are taught by actual clinicians, rather than computer instructors, and focus on applications most relevant to clinical practice.

- **Steve Dimse, M.D., University of Miami School of Medicine**
  LIPID: Decision Support for Hyperlipoproteinemia
  Hyperlipoproteinemia is a common, but complex, condition encountered by internists. Through effective use of the Macintosh interface, LIPID brings the expertise of the lipoprotein specialist to the practicing physician in an interactive and easily usable format.

- **Dr. Steve Erde, Cornell Medical School**
  Departmental Networking Solutions
  Dr. Erde discussed the setup and maintenance of an AppleTalk network at PathMac in the pathology department at Cornell University Medical College. This is a faculty/student lab network with 20 nodes and a UNIX®based file/volume server.

- **C. Frank Starmer, Ph.D., Duke University**
  Graphics Data Acquisition and Analysis
  Dr. Starmer described how a Macintosh equipped with a digitizing tablet becomes a powerful tool for acquisition and analysis of graphic data from charts, images, and graphs. Macintosh files thus created can be uploaded to a minicomputer or mainframe for further processing, management, and presentation.

- **Robert Beck, M.D., Dartmouth Medical School**
  Ed Schultz, M.D., Dartmouth Medical School
  Classroom Applications: Computer Tools for Medical Decision Making
  Drs. Beck and Schultz discussed the importance of easy-to-learn-and-use applications in the physician's office. They described two programs, MultiROC and D-Maker, used respectively for multivariate analysis and general sequential decision making.

- **Gary Schlikeiser, Reed College**
  Benchtop Software: Laboratory Interface
  The Benchtop Instrument laboratory interface, developed by Reed College, can be used to connect a Macintosh to virtually any digital or analog laboratory instrument. Schlikeiser described how it can be used to control the instrument and/or collect, display, and store data.

- **Mike Liebhold, Optical Media Systems Development Manager, Apple Computer**
  Optic Media Systems: Videodisc and CD-ROM in Apple's Future
  Mike provided a review of optical disc technologies currently being used, a survey of various types of applications being used (reference, simulations, instruction, productivity, creativity, and communications/transaction), and design strategies. The session concluded with a demonstration of the uses of this technology.

- **Curtis L. Anderson, University of Utah**
  Dr. Michael Lincoln, University of Utah
  Pathways to Medical Information
  In this session, two programs were described that help medical students manage the profusion of medical information available. Improving access to relevant, timely information and providing models for decision making helps medical students learn to make better judgments. The two programs are Iliad and Odyssey, developed at the University of Utah.

- **Carl M. Philabaum, Vice President, Authorware**
  An Icon-Based Authoring System: Course of Action
  (hands-on demo)
  This was a hands-on session using the Course of Action authoring system. It demonstrated how the program is used to create well-designed and interesting courseware via an icon-based system. Applications created can contain simultaneous animations, sophisticated student answer analysis, pull-down menus, objects that the student can manipulate, digitized sound, push-buttons, and special display effects.

- **Curtis Wise, Ph.D., Medical University of South Carolina**
  John Silver, D.V.M., University of Tennessee, Memphis
  Computer Literacy for Medical Professionals
  The teaching of basic computer skills at the Medical University of South Carolina is part of the required freshman curriculum, in order to enhance the students' appreciation of the computer as a useful tool in the practice of medicine. It is important, therefore, to reinforce this view, that faculty act as role models by using computers themselves.

- **Tom Laudeman, University of Virginia**
  Robert Beck, M.D., Dartmouth Medical School
  Artificial Intelligence: Expert Systems in the Health Sciences
  This presentation discussed the role that expert systems could play in the future of health care. There is a need to be aware of how to work with these systems, and the health care community is working out a philosophy for dealing with machine intellect. Laudeman explained the University of Virginia Health Information Center's expert rotation system for fourth-year students, which gives them some expertise in working with expert systems.

- **Frank Clark, Ph.D., University of Tennessee at Memphis**
  Creating an Infrastructure to Support Faculty Development
  Dr. Clark described the University of Tennessee at Memphis's efforts to encourage and support faculty development in the area of information technology. The steps undertaken have been successful in bringing about faculty courseware development and increased awareness among the administration of the need for incorporation of information technology into the training of health professionals.

- **Dr. Gary Moulton, Apple Computer**
  Dr. Jay Yourist, University of Miami
  Carol Cohen, United Cerebral Palsy
  Computers and the Disabled: Products, Programs, and Information Resources (panel discussion)
  This was a panel discussion on the impact of computer technology on the needs of the disabled individual. It included information on current philosophies about the use of technology with the disabled, and information about product availability for computer users with special needs.

- **Bryan P. Bergeron, M.D. Brigham & Women's Hospital**
  HeartLab

- **William C. Appleton, CourseBuilder**
  Bob Jones, University of Illinois at Urbana-Champaign
  Recent Advances in Authoring-Tool Technology
  Appleton and Jones discussed two new authoring tools: CourseBuilder and Guide. Both products allow nonprogrammers to build stand-alone applications for courseware very easily. Jones discussed the use of Guide, a hypertext product, as an information storage and retrieval system of virtually unlimited potential, applicable to the teaching of any subject matter.

- **Joseph Cansoni, Oregon Health Sciences University**
  Arthur Brown, Ph.D., Oregon Health Sciences University
  The Development of a Dental School Clinical Management System Using the Macintosh
  This presentation showed a cost-effective way of developing a comprehensive, computerized clinic-management system using the Macintosh and the AppleTalk network. At the Oregon Health Sciences University, Macintosh computers are available for students to use in managing their patients. A minicomputer is also then used to develop clinic management information through AppleTalk.

Computing in the Liberal Arts

Sponsored by:
Washington College and Apple Computer, Inc.

The second Computing in the Liberal Arts conference was hosted by Washington College, in Chestertown, Maryland, June 10–12, 1987. The conference focused on microcomputer power in the classroom, as a publishing tool, and as a communications tool, and on becoming familiar with the available Macintosh hardware and software.

The conference focused on microcomputer power in the classroom, as a publishing tool, and as a communications tool.

Attendees represented a wide range of liberal arts colleges and universities from around the country. The following institutions were represented:

Alvernia College
Boston Computer Society
Bowie State College
Bowling Green State University
Brown University
Carleton College
Catholic University
Chesapeake College
College of Notre Dame of Maryland
College of Wooster
Converse College
Cornell University
Davidson College
Dickinson College
Drew University
Drexel University
Eastern Mennonite College
Felician College
Furman University
Georgian Court College
Gettysburg College
Glassboro State College
Hartwick College
Keuka College
Knox College
Lafayette College
Lewis & Clark College
Marlboro College
Marymount College
Mills College
Mount Saint Mary College
Randolph-Macon Woman's College
Salisbury State College
Sarah Lawrence College
St. John's College

St. Mary's College
St. Thomas Aquinas College
Stanford University
Sweet Briar College
Texas Tech University
The College of Saint Rose
The King's College
University of Maryland
University of Michigan
University of Nebraska
University of Tennessee Memphis
Upsala College
Washington & Jefferson College
Washington College
Western Maryland College
Wheaton College
Whittier College
Wofford College

During the afternoon, a showcase let attendees see and try a variety of Macintosh products.

The first day of the conference was a relaxed travel day, and attendees could arrive, register and tour the campus to explore the ways in which Washington College is making use of Macintosh in the curriculum and in extracurricular activities. From 2 to 4 P.M., there was an opportunity for senior administrators to learn more about computing in an academic environment. Then, during the late afternoon, a Computer Hardware and Software Showcase allowed attendees to see and try a variety of Macintosh hardware and software currently available from vendors and third-party developers.

An Eastern family-style dinner kicked off the evening, and Washington College President Douglass Cater provided the official welcome. President Cater was followed by Brian Hawkins, Vice President for Computing and Information Services at Brown University, who spoke on *Computing in the Liberal Arts: The Acid Test*. The evening wound down with several hours of relaxation and collegiality, as attendees got acquainted with their peers.

Focused discussion sessions began the day on Thursday. Six concurrent sessions covered the following topics:

- *Funding Academic Computing*—Peggy Powell Dean & Associates; Arthur D. Sheekey, U.S. Dept. of Education

- *Computers and English Composition*—Eva M. Thury of Drexel Univ.; Susan Kirschener of Lewis & Clark College

- *Integrated Computing Systems: Distributed Computing*—Paul Bishop of Washington College

- *Developing Academic Software*—Janice Biros of Drexel Univ.; Steve Boyd of the Univ. of Nebraska

- *Desktop Publishing and Administrative Productivity*—Hayden Porter of Furman Univ.; Meredith Davies of Washington College

- *Computers and the Natural Sciences*—Rosett Roat of Washington College; Ken Rosen of Apple Computer, Inc.

After a short break, the sessions continued with six different topics:

- *Involving the Faculty Across the Curriculum*—Frank Clark of the Univ. of Tennessee at Memphis; Carol Lennox of Mills College; and Elizabeth Baer of Washington College

- *Computer and Social Science Simulations*—Michael Cheney of Drake Univ.; Janice Biros of Drexel Univ.; and Tom Maliska of Stanford Univ.

- *Student Access to Technology: Alternate Approaches*—Russ Larsen of Texas Tech Univ.; Chester Andrews of the College of Wooster

- *Computer and Teaching Statistics*—George Spilich of Washington College

- *Desktop and Administrative Productivity*—Chris Pelkie of Cornell Univ.; Meredith Davies of Washington College

- *Access to Academic Courseware*—Robert Hafer of the Boston Computer Society; Ken Rosen of Apple Computer, Inc.

Attendees were then afforded a liberal break in the middle of the day to have lunch and take advantage of Washington College's athletic facilities. From 1 to 3 P.M., the Computer Hardware and Software Showcase was also open. Sessions resumed at 3:00.

- *Computers and English Composition*—Susan Kirschener of Lewis & Clark College; Joe Martin of Cornell Univ.; and John Savarese of Davidson College

- *Authoring Tools*—Robb Griggs of Course of Action Software, Inc.; and Jeff Chafin of Washington College

- *Computers and the Fine Arts*—David Gregory of the Univ. of Michigan; David Adamson of the Corcoran School of Art

- *Involving the Faculty Across the Curriculum*—Frank Clark of the Univ. of Tennessee at Memphis; Carol Lennox of Mills College; and Elizabeth Baer of Washington College

- *Micro to Mainframe Computing Systems*—Larry Wood, Apple Computer

- *Computers and Social Science Simulations: STELLA*—Steve Peterson, Dartmouth College

At 4:30 P.M. a special presentation, *The Vision of a Computer Age Newspaper: USA TODAY*, was given by Nancy Woodhull, Vice President, News Services for Gannett Co., Inc., President, Gannett New Media. The evening was spent with a picnic at the Waterfront Pavilion and relaxation time for attendees to spend with each other.

Friday saw the conclusion of the conference and offered an opportunity for colleagues with similar responsibilities to share their views and concerns. Presidents and senior administrators grouped together, academic computing administrators shared their views, and faculty spent the morning discussing the impact of microcomputing on their respective areas. The sessions were then summarized in a general forum and discussion for the entire conference group. Ron Weissman, Director of Academic Computing for the Univ. of Maryland System presented a closing session: *Arts & Humanities; The Academic Computing Counterculture*.

Dean Elizabeth Baer of Washington College gave the farewell address at lunch, and the conference concluded.

Plans for next year's conference are beginning.

Plans for next year's Computing in the Liberal Arts Conference are beginning, and a location will be chosen over the next few months. The 1987 Conference was enormously successful. Attendees were very enthusiastic, the focused discussions presented a wide range of topics that were of interest to all, and the agenda permitted plenty of time to work on the Macintosh and exchange information with colleagues. Washington College was an outstanding host, and provided a Macintosh-networked environment for people to actually use—each attendee was given a disk with which they could use applications or send messages to each other via the InterMail system.

Everyone is looking forward enthusiastically to next year's conference; details will be provided in a future issue of *Wheels for the Mind.*

Wheels for the Mind U.K.

For those of our readers who are interested in Macintosh-oriented activities in Europe, there's a special version of *Wheels for the Mind* for you.

The overall aim will be to provide articles on both hardware and software subjects not currently covered elsewhere, and to provide references to material that can already be found in other commercial or semicommercial magazines and newsletters. One issue of *Wheels* will be produced each term, in A4 format. It is anticipated that information in these issues will be of interest to all levels of education and training, and in businesses that relate to the areas of use covered. The theme of the first issue is desktop publishing.

Contributions are welcome from all sources. Please send your articles, comments, suggestions for future articles, or letters to:

David Riddle
Wheels for the Mind (UK)
King's College, London, E.C.U.
552 Kings Road
London SW10 0UA

The electronic-mail address is:

Telecom Gold (a DIALCOM system)
84:MEP068
(accessible from Times Net)
JANET: UDUS010@UK.AC.KCL.CC.VAXB

Products

The **Macintosh Products** section highlights new or unusual products that are of interest to the academic community. Some of the products will be specifically concerned with the theme of the current *Wheels for the Mind* issue; others will be of more general interest.

Please send in suggestions about products that you think are worth publicizing to your colleagues in higher education.

MacBrain: An Interactive Neural Network Simulation System

MacBrain is a simulation system for working with neural networks, developed at the University of Chicago. It was created to provide a standard, easy-to-use, fast, and flexible development system, using off-the-shelf, relatively inexpensive, high-performance equipment. The goal was to enable more researchers and students to engage in simulation research into neural networks.

The goal was to enable more people to engage in simulation research into neural networks.

MacBrain runs on Macintosh computers from the Macintosh Plus on up the line. It allows interactive creation, editing, simulation, and analysis of arbitrary networks and provides workstation-level performance on a Macintosh II.

In addition, MacBrain includes an icon-based programming language that allows a neural network model to be used as a data/logic structure that can be accessed easily from within a "regular" serial-order program. This allows regular programs to easily take advantage of methods and ideas in neural network theory, by using a network as the computational kernel of the program. Because networks can represent both data and logic in particular domains, they can replace a great deal of regular code. This is particularly true in optimization problems and artificial intelligence projects. Thus, a very small program, connected to a network, could easily be used for such difficult problems as rough-relational data bases (which find exact and near matches in response to queries), circuit analysis, business optimization problems, system control, and so forth. The only programming necessary is customization of domain-specific routines. For example, a circuit analysis program would need a special parsing function that would take descriptions of components and map them onto a neural network using an

appropriate representation scheme. Extra routines could also be added for interactive graphic display of the circuits (including a mouse-driven graphics interface), which would take the equivalent of about 100 lines of Pascal to implement. An analog circuit program might take about 300 lines because of the more complicated parsing involved. Currently, digital circuit simulation is easier than analog, because representational mappings onto networks are better understood for digital circuits.

It is thus possible, at least in principle, to create programs that learn.

Programs written in the icon-based language can be made into stand-alone applications, be interpreted during simulation, or be incorporated into the system as tools for network analysis. It is thus possible, at least in principle, to create programs that learn. While only the network would change dynamically as the program is used over time, learning in the network changes part of the data and logic of the program as a whole. For example, a network with a front-end for a particular domain might ask the user, at the conclusion of a session, to evaluate the system's results. The user's answers could be used to direct more learning, allowing the program as a whole to improve adaptively.

The size of networks that can be created depends on the amount of memory available in the computer and on the degree of connectivity of the network. Linked lists contain the weight between units.

All system and model parameters are easily changeable. Within the simulation environment, users can create functions for activity-updating, learning, computing global or local energies, parsing input, or creating knowledge bases—or they can choose from among the many predefined functions.

The icon-based language can be used to generate large or complex networks automatically, and text-editing and graphics support are included so that models can analyze text or send output to user-specified animation routines. Tools are provided for creation of special graphics, development of knowledge bases and data bases, and analysis of networks. Color is used extensively to present additional dimensions of information.

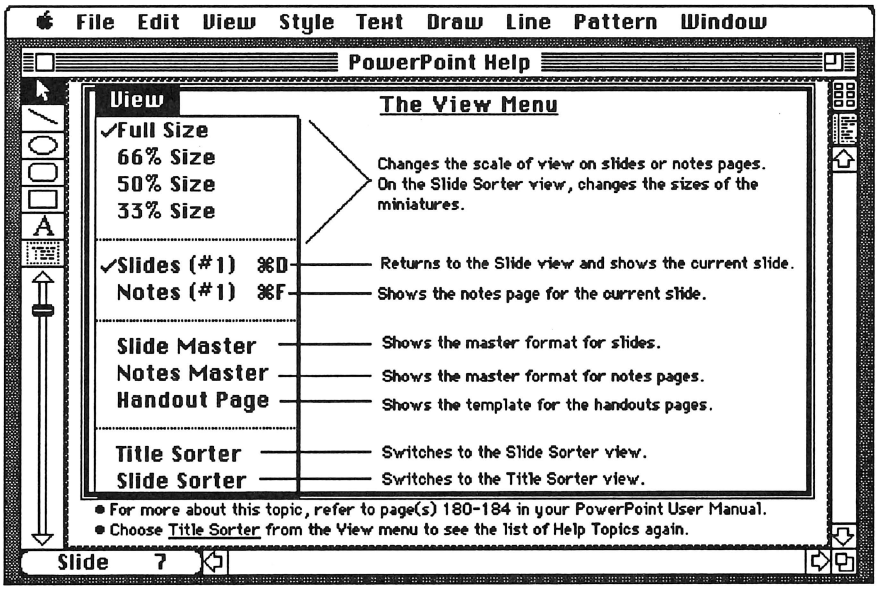
This material is excerpted from an IEEE-ICNN 1987 abstract submission.

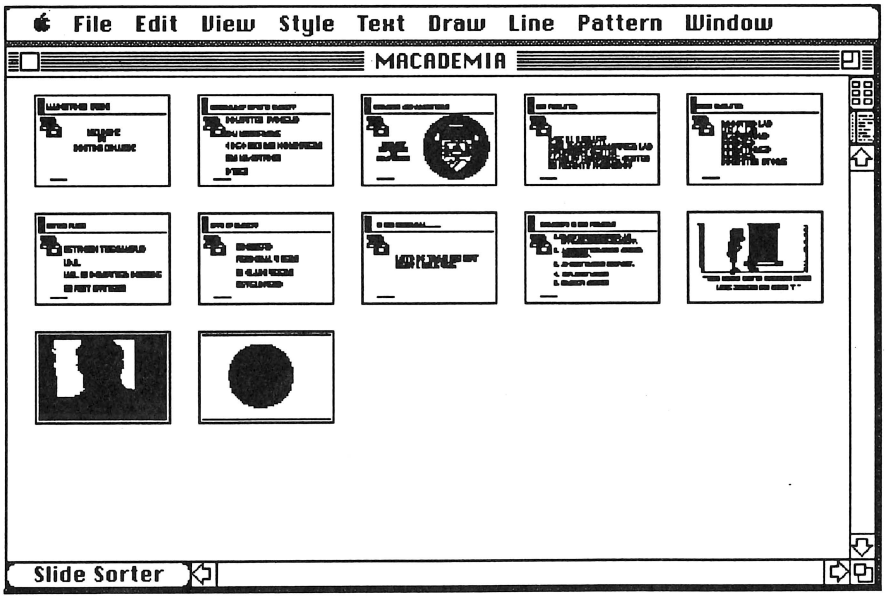
For more information, contact:
Matthew N. Jensen
Cognitive Science Lab
Dept. of Behavioral Sciences
University of Chicago
Chicago, IL 60637

PowerPoint: A Presentation Tool

PowerPoint is a software package that assists in the preparation of slides and presentations. It was designed for business users who want to control the appearance, as well as the content, of their presentations. The package was specifically designed to help users design visuals, arrange and organize presentations, and develop audience handouts. Its special-purpose tools include word-processing capabilities for multilevel bullet charts, diagram

PowerPoint assists in the preparation of slides and presentations, complete with speaker's notes and handouts.





drawing tools for illustrations, and on-screen slide sorters. Company logos, borders, dates, and slide numbers can be put on a Master Slide to give all of the visuals a standardized look.

Slides in multiple presentations can be arranged and rearranged or combined with other presentations using the title and slide-sorter features. Graphics and text can be imported to PowerPoint from most Macintosh programs.

PowerPoint requires a Macintosh computer with a minimum of 512K of memory and one 800K disk drive (or two 400K drives). The suggested retail price is $395. The package was developed by Forethought, Inc. It's distributed by Bonsu, Ingram, Micro D, and Softsel, and is also widely available through Businessland and Egghead stores.

For further information, contact:
Forethought, Inc.
250 Sobrante Way
Sunnyvale, CA 94086
(408) 737-7070

Inside Macintosh Summaries Available on Disk

***This product is designed to eliminate time-consuming references to* Inside Macintosh *and the* Apple Numerics Manual.**

The Programmer's On-Line Companion is an on-line data base reference utility for *Inside Macintosh,* Volumes I–IV, and the *Apple Numerics Manual.* It is designed to eliminate the need for time-consuming references to those books. The Programmer's On-Line Companion makes almost all of the Macintosh system calls, system globals, and assembly equates available through a few keystrokes, which means that a programmer need not search through files or books just to check some spelling, a parameter sequence, or an address. The reference consists of two main parts: a small program that installs itself in memory at boot time and an extensive data base. Once installed, the application waits to be summoned at any time from any program, providing quick access to virtually any item from *Inside Macintosh.*

The user interface is designed to be used while editing a source file in any of the Macintosh editors (though it will work on top of any other program). A single keystroke summons the Programmer's On-Line Companion, which appears as a small window at the bottom of the screen.

Once this window has appeared, you can enter a query, and the corresponding entry from *Inside Macintosh* is displayed in a Pascal-like format. The editor regains control after the entry is

displayed, and you can continue to edit normally within your development system, but the reference window stays on the screen.

The Programmer's On-Line Companion was written for programmers, and because most programmers are poor typists, some liberties have been taken with the user interface to make the program "fast and footloose." Because of this, the application doesn't always follow the standard Macintosh user interface guidelines. Nevertheless, the Programmer's On-Line Companion is simple to learn and use.

Some liberties have been taken with the user interface to make the program "fast and footloose."

It is important to recognize that this application was designed to augment, not replace, *Inside Macintosh* and the *Apple Numerics Manual*. It is not a teaching tool but rather a crib sheet for programmers. For example, it will not teach you what a "clip region" is, but it *will* remind you how to access and modify one. The structure of the program assumes that the user has a basic knowledge of Pascal or assembly language, *Inside Macintosh,* and the Macintosh itself.

The Programmer's On-Line Companion was developed by Steve Capps and is published by Addison-Wesley Publishing Company, Inc., Reading, Massachusetts.

MacLab

MacLab is the result of a project that was undertaken to develop a system for data acquisition and analysis using the Macintosh. The MacLab system consists of a peripheral hardware unit, which interfaces with the Macintosh computer via its modem port, and software packages. So far, two packages are available. Scope allows the Macintosh to emulate a single-channel oscilloscope. Chart allows it to emulate a four-channel chart recorder.

MacLab is a system for data acquisition and analysis.

In designing the system, the following criteria have been met:

- The system is extremely simple to use, being entirely menu-driven using the mouse. No codings need be memorised, and the keyboard is only required to generate titles when saving material to disk. (For a few specialised analytical tasks, the Shift key is also required.)

- The system closely resembles a storage oscilloscope (Scope) or a chart recorder (Chart). This lets people familiar with these instruments use the system easily.

- The Scope and Chart applications are fully compatible with other Macintosh applications, so data can be transferred in text form, using the Clipboard, to spreadsheet-type applications (including statistical packages) for further study, analysis, and graphing.

- The analog-to-digital conversion is fast enough (40 kHz maximum sampling rate) to provide excellent resolution of biological signals (for example, nerve action potentials).

- The system provides a cost-effective alternative to conventional storage oscilloscopes and chart recorders. In addition, it has many features not usually available on these instruments.

These considerations make this system an ideal choice for student use in teaching laboratories, as well as for research applications.

Scope

Using menus, Scope is set up as follows:

Sampling speed is selected (from 500µs to 10s/division), as is gain (from 200µV to 2V/division ie: ± 1mV to ± 10V full scale). Input amplifier options are chosen (AC or DC coupling, 50Hz or line frequency filtering, noninverting, inverting, or differential input), and a variety of triggering options are available, including 0 to 100 percent pretrigger, post-trigger, single or repetitive sweeps, and signal averaging. A digital-to-analog converter with low impedance output is contained in the peripheral hardware and can be used as a stimulator to give single or double, positive or negative, square wave pulses of selectable amplitude, duration, and delay. The desired analog signal can then be sampled and displayed (See Figure 1).

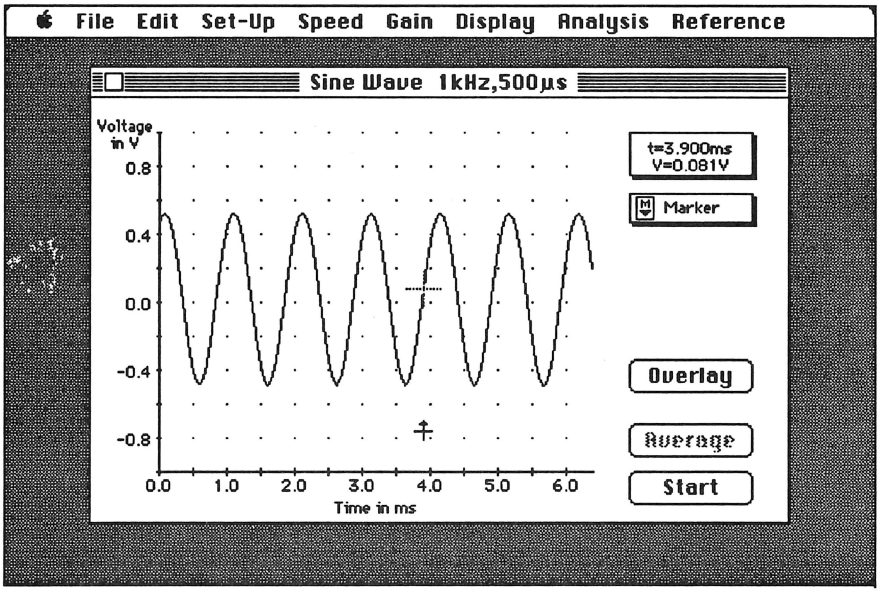


Figure 1

Using a zoom option, any selected portion of the waveform can be examined in detail. Individual data points can be shown separately or joined by a line. Using a cursor and marker, the time and voltage at any point on the waveform are displayed on the screen. A waveform can be used as a reference and displayed in gray to allow waveform comparison—up to 20 waveforms can be overlayed. The differential of the waveform at any selected point can be obtained, as can the integral of any selected section. Any waveform may be saved to disk, reloaded later for analysis, or printed.

Chart

Chart (See Figure 2) is set up similarly to Scope.

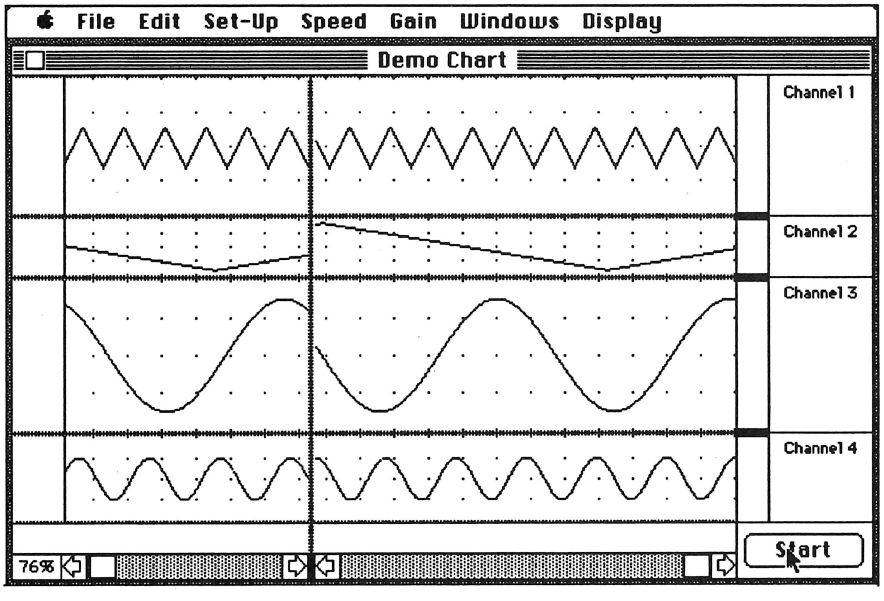


Figure 2

Using all four channels, the fastest available sampling speed is 100 ms/division, which is equivalent to a paper speed of some 10 cm/sec. A range of slower sampling speeds is available. Gains for each channel can be selected independently, and the input amplifiers can also be set up independently for each channel. The fraction of the window used to display each channel can be adjusted using the mouse. The screen can also be split vertically so that previously recorded data can be displayed alongside data currently being acquired. When sampling is started, the display scrolls across the screen in real time. As in Scope, zoom, overlay, differentiate, and integrate are available for analysis of the data (See Figure 3).

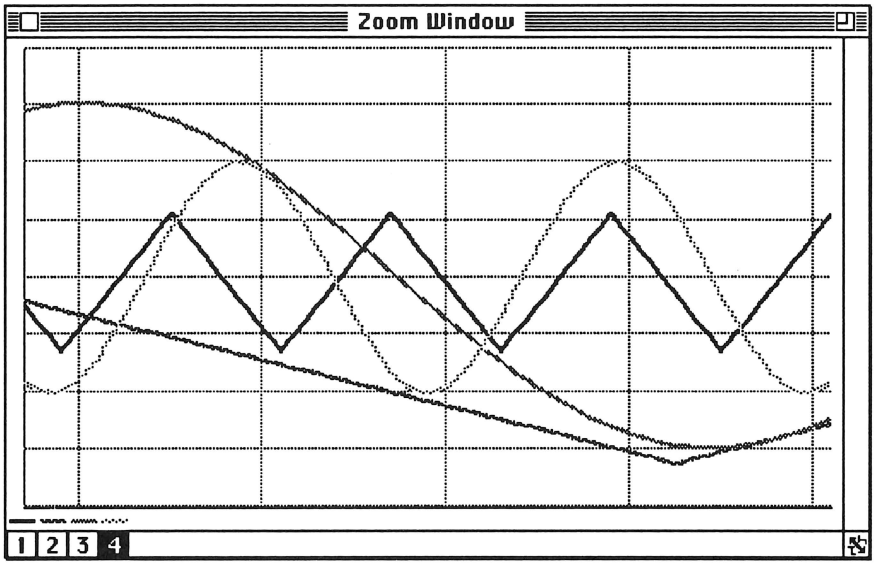


Figure 3

Data is stored throughout the experiment and can be printed out as a continuous record at the end of the experiment using the ImageWriter printer in Continuous Feed mode. At the fastest sampling speed, using all four channels, an 800K disk would be filled after 8.3 minutes; a 20-megabyte hard disk could contain 3 1/2 hours of recording.

Several software packages are in their final stages of development:

- **Neurophysiology package**—This is in the final stages of development. It will include three parts. As well as the two histograms, there will be a modified four-channel chart program to allow rates (such as heart rate and respiratory rate) to be displayed, as well as individual events. It will also be able to access Scope directly.

  The histogram systems work as follows. Before being sent to the MacLab hardware unit, individual action potentials need to be processed in a spike discriminator to produce TTL-level spikes. A number of commercial units are available to do this. The spikes are fed to the external trigger input of MacLab.

  In the TIH (See Figure 4) a histogram of the interval (or delay) between spikes is displayed.

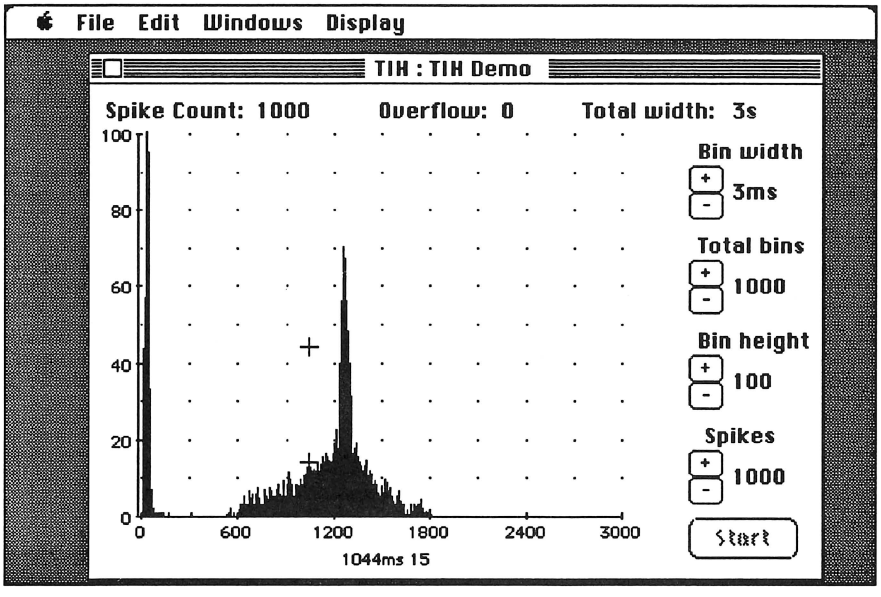


Figure 4

The software allows the user to specify the time resolution of the system (Bin Width, in progressive steps from 1 ms to 200 ms), and the number of bins (Total Bins, in a number of steps from 10 to 1,000). Up to 1,000 spikes can be recorded in any one run, and the scaling of the display (Bin height) can be varied during the recording and for later analysis. During analysis, any portion of the record can be enlarged using the zoom window, and a cursor is available that displays both the time interval and spike count for any selected bin.

In the PSH, a second voltage input, derived from the external stimulator each time it stimulates the preparation, is fed into Channel 1. This is used to signal the start of each sweep. The time-delay between the stimulus and resulting action potentials (signaled as TTL-level spikes) is displayed and accumulated. Again, bin width and total bins can be preset. Up to 1,000 consecutive sweeps can be accumulated, and bin height can be adjusted during sampling and analysis. During analysis, a cursor is available, as well as the zoom facility.

In both of these programs, the data processing is carried out in the hardware unit. The display on the Macintosh is continuously updated throughout the sampling.

- **Fast Fourier Transform**—This package (See Figure 5) is nearing completion. In its release version, it will allow either on-line transformation or transformation of selected prerecorded data.

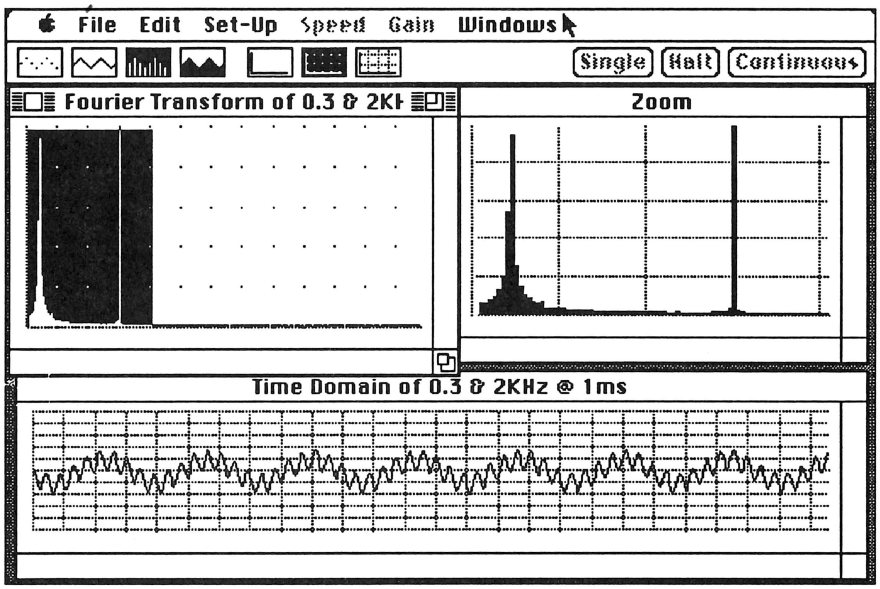


Figure 5

- **Development packages:**

  —Pascal Development System. This system comprises pre-compiled TML Pascal units that contain all the sampling and hardware control routines. In the TML environment, these can be used as the basis for writing MacLab applications. (Programs can be written to use the hardware unit for specific applications.) This package should be available in mid-1987.

  —6502 Development System. This system consists of a 65C02 assembler that runs on the Macintosh. It can be used to write specialized routines, which are then downloaded and executed in the MacLab hardware. For example, the sampling routines used for the Neurophysiology packages were written using a pre-release version of this system. The release version should be available in mid-1987.

- **Expanded 1/0 system**—To allow MacLab to control peripheral devices, an expansion board is being developed that will be contained within the hardware unit and provide up to 16 digital input-output lines. All hardware units contain an expansion slot to accommodate this and other boards that we plan to develop. It will be a simple matter to mount the board in MacLab and connect it to the digital PCB. Using the development systems, it will be possible to write routines to control the output lines and to read the status of the input lines.

- **X-Y Plotter**—In addition to the facility for obtaining an X-Y plot of pre-recorded data available in Chart, a package will be available later in 1987 that allows real-time X-Y plotting of the inputs to any two channels. This means that MacLab will be able to emulate an X-Y chart recorder.

The hardware units are manufactured to full commercial standards, using top-quality components on double-sided printed circuit boards. They are being sold to educational institutions and their members, at a special discount price of $1,750. The commercial price is $2,150. Further information, including a demonstration disk and guide ($30), can be obtained from:

A. D. C. Macknight
Department of Physiology
Medical School
P.O. Box 913
Dunedin, New Zealand
64 24 740-064, Ext. 830
Telex: Hosbord 5706

Stepping Out: The Macintosh Screen Extender

Stepping Out is software that lets Macintosh 512K or Plus owners have most of the benefits of a big screen for one-twentieth of the cost.

Stepping Out "fools" the Macintosh into thinking it has a bigger screen than it actually does.

Stepping Out "fools" the Macintosh into thinking it has a bigger screen than it actually does. The user chooses the screen size most appropriate for the task at hand. The size of the screen is limited only by the memory available. For example, a full-page display of 640 by 864 pixels requires 150K. The view of the page slides over when the cursor hits the edge of the physical screen. The user can work with the entire screen at once via commands that let you reduce the screen size from two to four times. Enlargements of from two to sixteen times are available for detail work.

CAD users, desktop publishers, and anyone who would benefit from a bigger screen can use Stepping Out. Stepping Out works with applications that work with big screens: MacDraw, MacWrite, WriteNow, PageMaker, SuperPaint, Microsoft Excel, Ready,Set,Go!, and others. Wide tables, big spreadsheets, and full-page layouts are no longer limited by small viewing windows and slow scrolling.

Berkeley System Design's primary focus is the development and marketing of products for the disabled. Stepping Out, which will be the company's first product for the mass market, grew out of inLarge, a product Berkeley System Design developed for the visually impaired.

Stepping Out sells for $95 retail. It is now available from Macintosh dealers and distributors, as well as from Berkeley System Design.

For more information, contact:
Berkeley System Design
1708 Shattuck Ave.
Berkeley, CA 94709
(415) 540-5536
AppleLink: D0346

Scholar's Aid: A Reference-Creation Tool

Have you ever wished that your computer could handle your references?

Have you ever written a long paper and then found one more reference that really should be included in the first paragraph? There you are, with 30 references to renumber! Have you ever wished that your computer could do it for you?

Scholar's Aid lets your Macintosh computer do that and more. The program searches your text for figure, table, equation, and reference citations, and sets up files to be printed using Microsoft Word. The finished document has figures, tables, equations, and references numbered consistently in the text, and includes a reference list in the format you specify. The reference list can be compiled by a search of a data-base file of references (a bibliography), using a Microsoft File data base.

Scholar's Aid makes writing documents easier, because you don't have to think about numbering of figures and equations, freeing your mind to concentrate on the writing.

Need a proposal made up of sections from old papers? Just copy them and paste them together with Scholar's Aid, and you're ready to renumber and make a new reference list. Once your bibliographic data base is big enough, you'll find that most of your citations are already available for inclusion in new documents. Need to resubmit a document to a journal with a different reference format? It's easy with Scholar's Aid.

This application requires a Macintosh 512K with two disk drives. It is a shareware program with a tutorial to get users started. Users can register for $35 and get a 37-page user manual.

For additional information, contact:
Stuart E. Strand
19016 Ashworth Ave
Seattle, WA 98133

CourseMaker: An Authoring System

Developed at the University of Nebraska, CourseMaker is an authoring system for the Macintosh. It is not intended to compete with high-end authoring systems, but rather to provide an easy-to-use, inexpensive, yet powerful alternative. Any instructor who can use the Macintosh for word processing should be able to master the program in less than half an hour.

CourseMaker lets users design screens with any number of windows and buttons. Once made, any element may be edited or deleted. Windows may be used to display text or graphics, or as blanks for student input. The screen sequence is determined by dragging the pointer from a button (for example, "Next") to the appropriate screen. All operations are controlled either through menus or by clicking and dragging. CourseMaker presents two views: one for working on the design of a particular screen; the other an expanded view showing all the screens, which is used for sequencing.

CourseMaker lets users design screens with any number of windows and buttons.

For further information, contact:
Steve Boyd or Gerry Brookes
English Department
University of Nebraska
Lincoln, NE 68588-0333
AppleLink: U0128

MacGNOME

MacGNOME is a project devoted to developing integrated novice programming environments. These environments are tailored to the specific needs of the novice programmer, and yet they are helpful to the experienced programmer, as well. MacGNOME will supply the computer science instructor with many valuable resources: first, an integrated environment, so that the novice does not have to switch between tools with different command interfaces (because the editor knows about the language being edited,

and can provide intelligent help and guidance, quick and accurate feedback is directed to the novice); second, MacGNOME environments also ensure syntactic correctness while editing, so the novice can concentrate on semantics. By using multiple views of a program, they facilitate teaching of *abstraction*, a fundamental concept in computer science.

Two MacGNOME environments are currently under development.

Two MacGNOME environments are currently under development for the Macintosh:

- **Karel the Robot**—Based on a language developed by Rich Pattis at Stanford University, Karel teaches fundamental concepts of programming without the burden of a complex language. The Karel environment can be used in elementary and secondary schools, as well as in the first weeks of a college introductory computer science course. This environment currently requires a Macintosh 512K (an external disk drive is suggested). Karel the Robot is scheduled to become available through Kinko's Academic Courseware Exchange by the end of June 1987.

- **Pascal**—Pascal is the language used by the College Board to deliver its advanced placement computer science course. Pascal is also used to teach introductory programming at most of the leading computer science universities in the country, including Carnegie-Mellon. This environment requires a Macintosh Plus and an external drive is recommended. A version will be released by the end of July 1987.

For more information, contact:
Rob Chandhok or Phil Miller
Center for Art & Technology

or

Computer Science Department
Carnegie-Mellon University
Pittsburgh, PA 15213
(412) 268-3342

MacDTP: A Desktop Publishing Data Base

How will desktop publishing (DTP) impact American business? What are the costs? How fast will the market grow? Which products will do the job? Where can you find them?

The answers to these questions and others can be found through MacDTP, the desktop publishing data base. MacDTP is a

bibliography that lists, in detail, every article that has appeared on Apple Desktop Publishing for the past three years. MacDTP gives you the following:

- In-depth annotation of 1,200 citations from all business and trade publications.
- Full coverage from 1983 to December 31, 1986 (includes the Lisa computer).
- Breakdown by hardware and software products as well as applications.
- Automated search-and-sort in easy-to-use Microsoft File format.

This application comes on an 800K Macintosh disk for $75 from Crown Communications, P.O. Box 11626, St. Paul, MN 55111-0626.

Customized searches are available on pro rata basis; write Crown Communications or call (612) 698-0051.

MACTRAN77 Version 2.0: FORTRAN for the Macintosh

MACTRAN77 is a powerful FORTRAN Development System for the Macintosh, which integrates a text editor, a native code compiler and an on-line symbolic debugger. MACTRAN77 is easy to use and conforms to Macintosh interface guidelines. It provides the developer with everything needed for fast development of Macintosh-style engineering and scientific applications—a truly integrated environment. With a single invocation of MACTRAN77, you can edit, compile, link, execute, or debug FORTRAN programs any number of times without having to return to the Finder. Moreover, transfer of control from one component to another does not include any loading process. All these features add to the developer's productivity.

MACTRAN77 provides the developer with everything needed for fast development of engineering and scientific applications.

Designing language compilers for the Macintosh should be a special effort, not a matter of using standard, well-known techniques. Borland and Think Technologies draw attention to the Macintosh features for Pascal and C. MACTRAN marries the visual beauty of the Macintosh to the power of the world's most popular and powerful language, FORTRAN.

The MACTRAN77 compiler implements full ANSI77 standard features and also supports such extended features as COMPLEX*16 data type, binary file type, and calls to Macintosh Toolbox. It provides all the features required to develop scientific and engineering applications. It supports IEEE 754 floating-point

formats for single- and double-precision real numbers, as well as single- and double-precision complex numbers and intrinsic functions.

The compiler generates fast and efficient native code, which is position independent. It also performs optimizations such as constant folding, common subexpressions elimination, and use of registers for index variables. The compiler supports metacommands such as include files, conditional compilation, Do Loops in FORTRAN66, and nooptimize. To enhance program development, the compiler has an exhaustive set of diagnostic error messages.

The linker lets you have separately compiled modules. You need to use it only if your program runs into more than one module or uses subroutines from MDS-compatible assembly or "C" .REL files.

A library for 68881 support lets you harness the floating-point coprocessor to give you 40 percent to 400 percent improvement in execution speed.

The text editor is similar to MacWrite.

The text editor is similar to MacWrite. It eliminates the need for a program listing on the paper and shows the source program and the list file in two separate windows. You can scroll through the list window to check for errors and make corrections in the corresponding source statements. Moreover, you can view two portions of the same file in separate windows at the same time and edit either of them. Apart from the normal edit features—Cut, Copy, and Paste—the editor also allows you to search for specified text and replace either a single occurrence or all occurrences by a simple command. Another interesting feature of the built-in editor is that pressing the Tab key takes you to column 7. MACTRAN77 also accepts MacWrite text files.

MACTRAN77 provides a very simple and easy-to-use High-Level Toolbox Interface to harness the capabilities of Macintosh. Using it, you can develop Macintosh-style applications with windows, pull down menus, graphics, and mouse events. It's so simple, in fact, that even a novice can become adept at developing such applications in a short time. For faster development, we have provided complete and detailed documentation for the Toolbox interface, with illustrative examples.

MACTRAN77's Symbolic Debugger provides just about everything a FORTRAN program developer needs. The debugger offers features such as the ability to display and modify a variable value, single-step and monitor a variable. It also allows you to view the value of a range of array elements. You can specify identifiers as subscripts for array elements. You can even group a set of frequently needed variables, and the debugger will automatically show their values at breakpoints in an "observe window." The debugger shows you the source program in a window, and the

program output in another window. You can scroll through the source program window and set or remove breakpoints. The debugger even lets you animate your program by pointing at the statement being executed, thereby tracing the flow of program control. This means that you can debug your programs quickly, without clumsy PRINT statements or paper listings.

MACTRAN77 comes with a set of tutorial disks, a language reference manual, and a user manual. The tutorial is a self-running Macintosh-style demonstration that familiarizes the user with the various operational procedures of MACTRAN77. The comprehensive language reference manual gives all the language details. It clearly explains each statement implemented and illustrates its use with examples. The user manual is a guide to all the operational aspects of MACTRAN77. It contains a detailed documentation on the High-Level Toolbox Interface. In addition, there are illustrative examples with listings to demonstrate how to use the Toolbox interface.

MACTRAN77 is not copy protected. There are special discounts for the university segment.

We are committed to producing only the highest-quality software and offering all the support that developers need. We are currently working on upgrading MACTRAN77 further to support VAX and FORTRAN 8x extensions, generate in-line 68020/68881code, support the MPW environment, and more.

For additional information, contact:

Prakash Narayan
DCM data products
1710 Two Tandy Center
Fort Worth, TX 76102
(817) 870-2202

ChemIntosh: A Desktop Publishing DA for Drawing Chemical Structures

ChemIntosh lets you include chemical structure diagrams in word-processing documents.

Do you need to include chemical structure diagrams in word-processing documents? A new desk accessory, ChemIntosh, lets you draw a structure while your word processor is still active and then transfer it into the document without leaving the word processor. ChemIntosh combines the convenience of a desk accessory with the features of an application. It can undo mistakes, display on-screen help, print, resize objects (even text), and save and open documents. It has palette tools for placing symbol strings, drawing nine different bond types, and four straight arrows—reaction,

equilibrium, resonance, and dashed. It can draw solid or dashed circles, ovals, and arcs. Just drag the mouse outside of a circle or oval to specify the desired arc. Arrows are added to either or both endpoints of an arc simply by clicking the endpoint. As in SuperPaint, a reduced view of the entire document page is available. You can align selected objects with just a mouse click. It even has rulers.

A simpler desk accessory, ChemPanion, includes all of the capabilities found in ChemIntosh for drawing chemical structures that can then be transferred to any other document that accepts standard QuickDraw pictures.

To receive a free demo disk or information on either product, contact:

SoftShell Company
P.O. Box 632,
Henrietta, NY 14467
(716) 334-7150

Free DA for Calculating Molecular Masses

A free desk accessory for calculating the molecular mass of a chemical formula, ChemIntosh Molecular Mass Calculator, is being distributed by SoftShell Company. The DA calculates the standard molecular mass or the exact mass derived from the most abundant isotope as used in mass spectroscopy. To receive a free copy, send a self-addressed, legal-size envelope to SoftShell Company, P.O. Box 632, Henrietta, NY 14467.

Common LISP for Education

ExperCommon Lisp—with its more than 1,100 functions, powerful class system, and smart on-line debugger—is now available to schools for $195. It's the ideal tool for learning serious, object-oriented programming in Common LISP.

ExperCommon Lisp is the only Common LISP that runs on a Macintosh Plus.

- ExperCommon Lisp is the only Common LISP that runs on a Macintosh Plus. ExperTelligence, the company that developed the language, has created a special low-cost version available exclusively to students, faculty, and schools.

- Those elements specifically designed for the professional developer have been removed from this educational version; ExperCommon Lisp\ED doesn't have access to the Macintosh Toolbox and won't allow the creation of stand-alone

applications. These changes, however, pose no limitations to students learning the language.

ExperCommon Lisp\ED is available now. Shipping has already begun, and each unit is backed by the famous KABWAW (Kill a Bug, Win a Walkman) guarantee. ExperTelligence is committed to creating bugfree software, and it's ready to reward anyone who helps identify potential problems.

ExperCommon Lisp\ED is backed by the KABWAW (Kill a Bug, Win a Walkman) guarantee.

You can deduct the cost of the educational version from the price of the full professional system. You may even be eligible for a software grant if you enroll in the ExperTelligence "Individual Developer Program."

Also, if you can interest enough friends, you'll qualify for a special discount. ExperTelligence offers an additional 20 percent off for orders of 5 or more.

For more information or to order, call 800-826-6144 (in California) or 800-828-0113 (Continental U.S.), or dial direct (805) 969-7871. You can also reach ExperTelligence through AppleLink: V0101 or via Telex at (3710733 EXPERTEL).

ExperCommon Lisp: An AI Development Tool

Artificial intelligence (AI) is a technology that allows computers and robots to mimic human reasoning (expert systems), recognition (speech and image analysis), communications (natural language), and actions (robotics).

Of these applications, the development of expert systems shows the most promise. Using advanced programming techniques and symbolic processing languages (such as LISP or Prolog), programmers have been able to create applications that are extremely diverse: medical (diagnosis, interactions between drugs, treatment), industrial (maintenance, scheduling), teaching (adaptive teaching tools), and data processing (natural language parsing, "smart" decision analysis).

Of AI applications, the development of expert systems shows the most promise.

Though plentiful, these results are more a testimony to the usefulness of AI, than explicit examples of success. Why? Because the development and use of these applications is limited by the availability of appropriate hardware and software. Developing AI applications has traditionally required a dedicated LISP machine (costing more than $100,000) and highly specialized software (also costing many thousands of dollars).

ExperCommon Lisp is a complete, professional, AI application development system for the Macintosh. It has five major components:

- Common LISP language
- Class system tools for the advantages of object-oriented programming
- Toolbox access directly from LISP
- Debugger
- Stand-alone delivery

Common LISP

Common LISP is fast becoming the standard dialect for AI research in the United States. An extremely powerful and flexible tool, Common LISP offers language features to ease the development of any application, as well as sophisticated AI and symbolic-processing applications. ExperCommon Lisp contains a major subset of Common LISP for the Apple Macintosh Plus computer.

ExperCommon Lisp includes a memory-resident Common LISP compiler for fast-running programs. The compiler generates 68000 native code directly from Common LISP source code. Many of the ExperCommon Lisp primitives contain special compiler directives to produce highly optimized code. In addition, many of the primitives are written in handcrafted assembly language for increased speed and compact size.

ExperCommon Lisp *is* Common LISP. The knowledge you gain and the programs you write are immediately portable to other implementations of Common LISP, even to dedicated LISP machines.

Among its language features, ExperCommon Lisp includes:

- Sequencers—Generic operations on strings, lists, and vectors.
- Keywords—Named optional arguments.
- String operators—To perform comparisons and manipulation of strings of arbitrary length and case.
- Character operators—To perform comparisons and manipulation of characters (the building blocks of strings).

- Floating-point and transcendental functions—Expansive functionality for the 80-bit precision floating-point numbers.

- Bit-wise logical operators.

- Advanced control structures—To provide control over program flow and other characteristics.

- Multidimensional arrays; multiple values—Functions that can receive and return multiple values.

- Extensible LISP reader—Written entirely in ExperCommon Lisp, the reader is completely extensible, allowing the user to change the syntax and legality of characters, as well as to write dispatching macros to create a new reader that meets your parsing needs.

Class System

Object-oriented programming is no longer an experiment in programming methodology; it is a viable way to write and maintain applications. The key features of object-oriented programming—*data abstraction, information hiding,* and *generic operations* —are supported by the ExperCommon Lisp class system. The class system is fully integrated with the compiler, for fast execution, and with the symbolic debugger, for fast development. The class system is also completely integrated with LISP, and fully extensible. The ExperCommon Lisp class system has many similarities to Flavors (the class system found on several LISP machines), though we've added some features that even Flavors does not support: class variables and metamethods, for example. These powerful features (and others) originated in Smalltalk (at Xerox PARC), the most widely recognized object-oriented language.

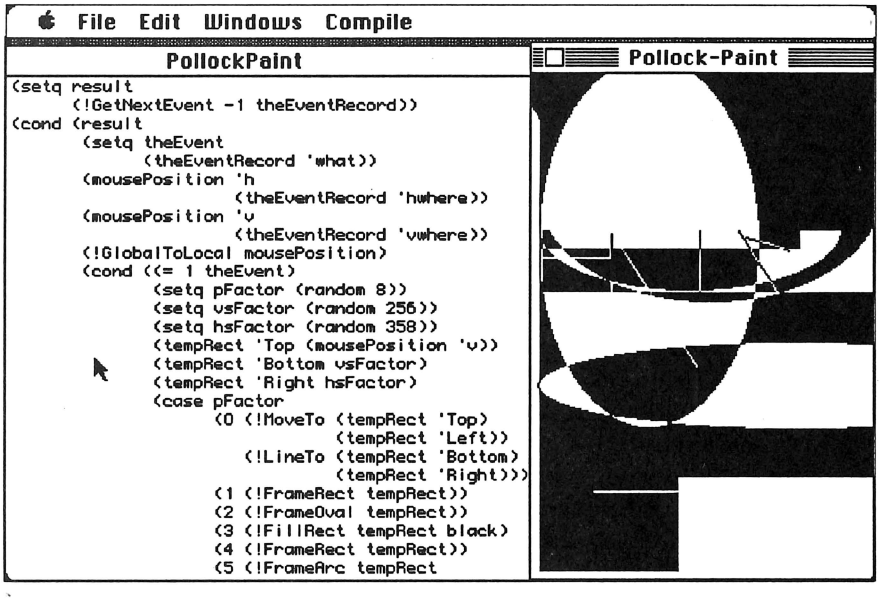
Macintosh Toolbox

Language features, though, are not enough for the development and delivery of AI applications. Today's applications require an intuitively powerful user interface, rapid response to user input and actions, and graphics tools to illustrate and display information clearly. Delivery is another concern, because these applications can only be useful if they are available to those who need them. This requires the ability to deliver on powerful, cost-effective, and widely available hardware.

The Toolbox gives you more power than any other environment—including that of LISP machines.

The Apple Macintosh Plus personal computer supplies custom routines (more than 600) located in ROM. The Toolbox, as it is called, includes tools for managing data resources, QuickDraw graphics, multiple text fonts, nonmodal user interface through events, windows, controls, menus, test, dialog boxes, international conversion, memory, files, printing, sound, serial ports, and IEEE floating-point routines. This library gives you more power than any other environment available—including that of LISP machines.

The Macintosh Toolbox routines are religiously supported by Apple and by ExperTelligence. Coordinated and detailed documentation is available from Addison-Wesley, Apple, ExperTelligence, Hayden, and a host of other publishers. Your applications stand on tested, copiously documented, and stable ground.



In addition, predefined classes, and procedures for Macintosh Toolbox support are already implemented in ExperCommon Lisp. Just because the Macintosh offers the most advanced user-interface tools available doesn't mean that you need to be the most advanced user to take advantage of them. The full-featured class system provides more than 60 predefined *Toolbox objects*, which improve upon the "records" associated with Toolbox programming. The class system enables you to symbolically access the fields within an object. It also allows you to isolate the components of your program, resulting in easier coding and more readable programs, thus dramatically increasing the ease of maintenance and reliability of your code.

The user interface takes full advantage of the Macintosh standards, enabling you to edit multiple documents simultaneously; cut, copy, and paste text between windows, the Clipboard, and the Scrapbook; balance LISP expressions with blinking parentheses that work both forward and backward; edit in multiple font sizes; and interactively compile sections of code.

Package Components

Software: Two 800K Macintosh disks containing the ExperCommon Lisp editor and compiler, sample programs, and applications, and ResEdit (the Apple Computer resource editor).

ExperCommon Lisp is a major subset of Common LISP language with Macintosh Toolbox access, object-oriented extensions, and extensions to allow delivery of LISP applications (when used with optional ExperCommon Lisp file compiler).

Documentation: 640 pages of documentation divided into three logical sections (volumes) and delivered in two 3-ring binders, with a complete table of contents and index. Descriptions of each LISP primitive include numerous examples. Individually bound release notes cover information specific to a software release.

In addition to this documentation, ExperCommon Lisp offers you your choice of two additional books: *Common LISP—The Reference Manual,* by Guy Steele, and *Programming in Common LISP,* by Debra Tartar.

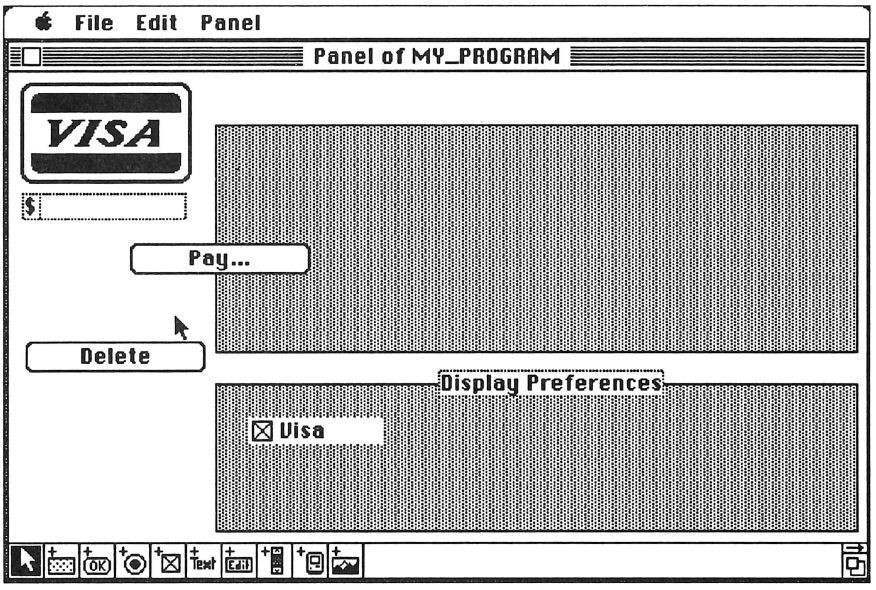
Interface Builder: An Application Development Tool

The Macintosh has opened up a new frontiers for computer use. But at the same time, it has made the development of a good Macintosh application very difficult. If developing a Macintosh application were as easy using MacPaint or MacDraw, many powerful new applications could be created by the professionals who need them, rather than by dedicated Macintosh programmers.

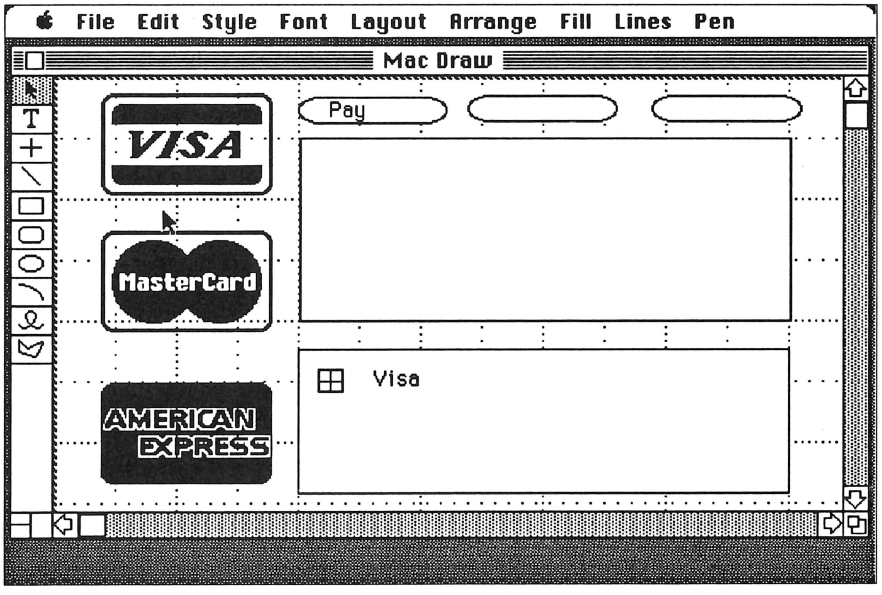
One could easily use MacDraw to explain to a programmer what the new application should look like. Unfortunately, the model is static, and hence, not very useful.

What's needed is a *dynamic* prototype that we can experiment with and modify. We should be able to test a new idea in seconds, not days.

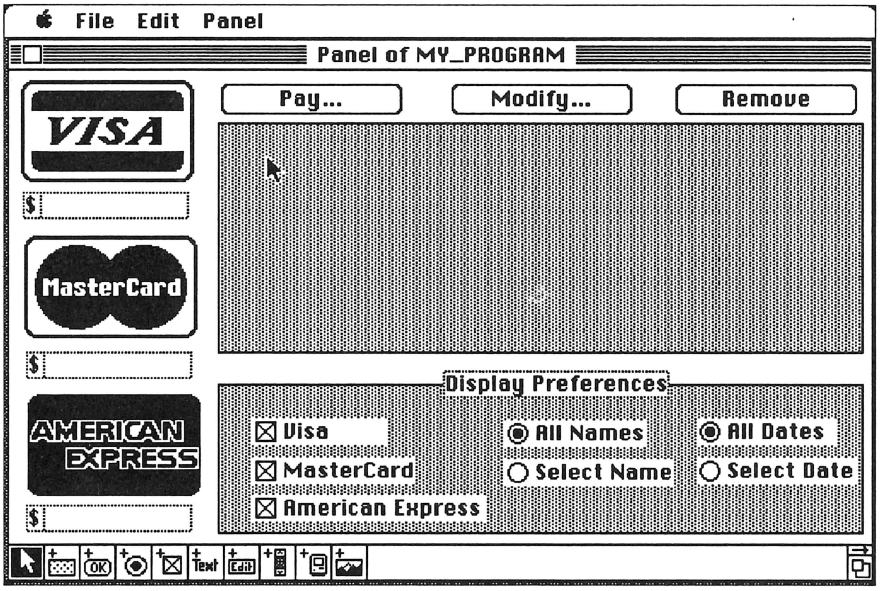
Working with Interface Builder is similar to using MacDraw. You select the type of object (button, text box, scroll bar) you want to work with, and place it on the window. Every object can be associated with a LISP function.



It is this function that will be called when the application is run. A powerful editor is immediately available to insert pictures, icons, and other objects.



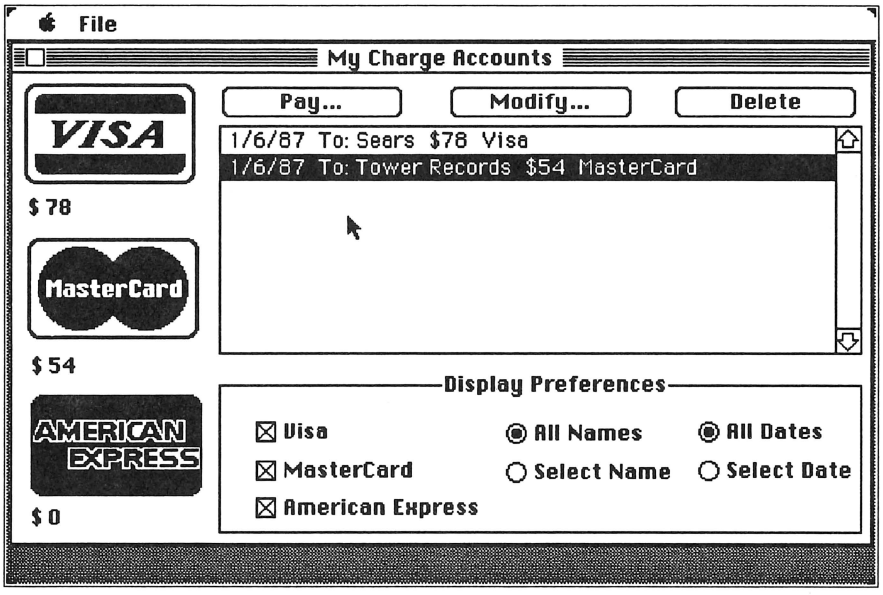
Three minutes later, we have added check boxes and radio buttons to our application.



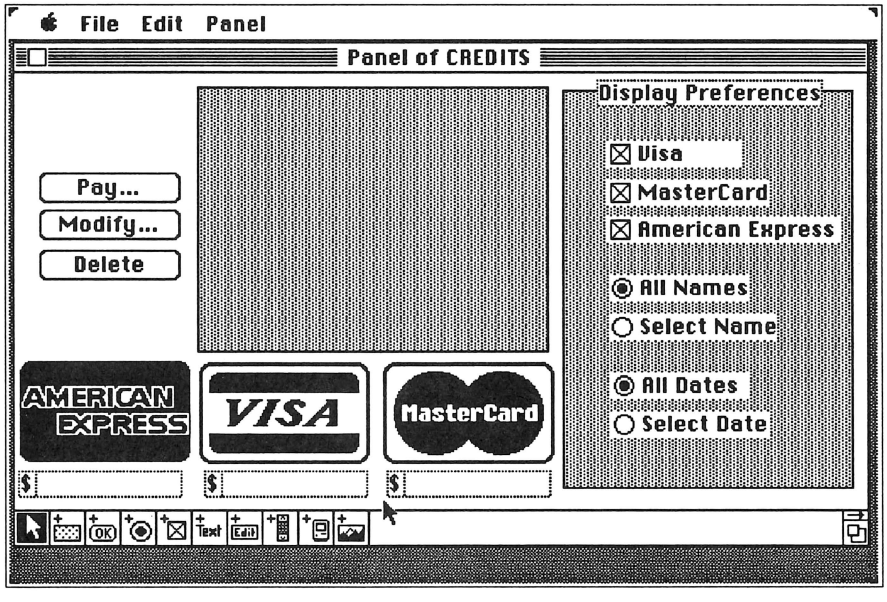
Notice that we have fully integrated the application's user interface without typing a single line of code. This is the ultimate in top-down design, starting with the user interface and implementing the programming details in the second phase of application development.

Now that the appearance of the application is complete, one need only define the menus and keyboard.

Simply tell Interface Builder what the menu titles are, and what functions to execute for each item in the menu. Your interface is now complete. It's time to test it. At the click of the mouse, *without* leaving LISP, you execute the application.



At this point the interface is done—or so you think. But when you show it to your partner, she says that you put the buttons in the wrong place.



Now you have the identical application with a completely different look. You can even allow users to modify and customize the interface themselves, simply by putting it back into Edit mode, and moving the objects around.

Features

For the conceptual designer:

- It lets you design an entire Macintosh interface without a programmer.
- It makes it easy to modify your working application interactively.
- It allows true "top-down" application generation; you can test the concepts first.

For the programmer:

- A programmer need not know how to use the Macintosh Toolbox.
- It allows the creation of an object-oriented generic application.
- It makes source code available for default methods.
- It allows rapid development, since over half of any program is the interface.
- It is fully modular; completed subapplications work together with *no* modifications.

Technical Specifications

Interface Builder is entirely written in ExperCommon Lisp, using the built-in class system. It executes in the Common LISP environment, allowing rapid interactive development and debugging. Combining the most powerful interface development tool in the world with the most powerful artificial intelligence language available facilitates the creation of sophisticated applications, limited only by your imagination.

The algorithmic part of the applications is written in Common LISP. This lets you utilize all the power of list processing, dynamic data structures, and over 800 functions to manipulate lists, strings, numbers, symbols—constituting the world's most powerful "symbolic toolbox." Since the ExperCommon Lisp compiler is incremental and generates 68000 code directly, it is both fast and easy to use. Interface Builder is directly integrated into the ExperCommon Lisp environment, allowing alternate modification of the interface and of the code without leaving LISP.

Common LISP applications developed on other machines can be transported to the Macintosh easily, letting Interface Builder handle the Macintosh Toolbox.

Completed applications can be delivered with minimal overhead; the generic application only requires only 32K of memory. Double-clickable applications can be made that do *not* require the user to own LISP. *No* royalties are involved.

Package Components

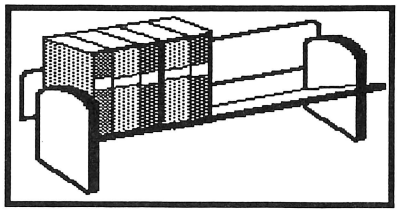
Software: One 800K Macintosh disk containing Interface Builder, the generic application, and many sample programs. Commented source code for default methods and all sample programs are included.

Documentation: Two volumes. The first documents the use of Interface Builder by the conceptual designer to create an application interface. The second is written for a programmer, detailing how to use the generic application.

User Support: ExperTelligence offers an initial 45 days of free technical phone support. Users speak directly to knowledgeable technical personnel who can help with any problems or questions you might have. Ownership of any ExperTelligence product also entitles you to receive our bimonthly newsletter and advance information about new products and new releases, as well as significant discounts on all new purchases of ExperTelligence products.

For further information on either ExperCommon Lisp or Interface Builder, contact:
ExperTelligence, Inc.
559 San Ysidro Road
Santa Barbara, CA 93108
(805) 969-7871

Resources



We've been spring-cleaning—tossing out the old entries and replacing them with new. So the **Resources** section in this issue is shorter—but perhaps more interesting—than in previous issues.

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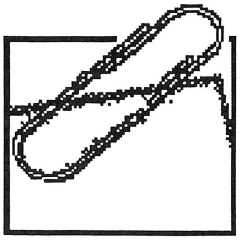
Project Reports



Our spring-cleaning wasn't limited to the Resources section; the Project Reports section is also starting out fresh.

This section of *Wheels for the Mind* presents many of the projects that are being developed at various colleges and universities. The listings are not restricted to Consortium schools or to schools in this country; you will find projects that are being done at universities all over the world.

Some of the items listed here are just in the beginning stages, while others are completed and ready for distribution.

Wherever possible, we have tried to list an appropriate contact, in case you are interested in finding out more about a particular listing.

One of the original intents of organizing educational institutions around the Macintosh was to provide opportunities for creative people to share their expertise and talents. We are sure that you will find much of that creativity in evidence here.

Please feel free to collaborate on developing an application, to develop one on your own, or simply to use one that was developed by one of your colleagues.

Most important, let us know what YOU are working on. Perhaps there are others around the world who might like to work with you! Send us a description of your project.

Computer Science

InForm

InForm builds cross-reference lists and abstracts of Pascal programs and reformats sources to a standard form. In contrast to Apple's PasMat, InForm does not suppose that your program is syntactically correct. It supports all usual Pascal compilers.
Current status: Version 2.0 completed.
Contact: Günther Sawitzki, StatLab, Im Neuenheimer Feld 294, D 6900 Heidelberg, West Germany

Computer Science

Template

Template is another extendable Pascal program for the Macintosh. It uses a layered design to help Macintosh novices make the steps from "classical" programs to event-driven programming. Template includes a collection of about 50 subroutines, which are commonly used to provide a Macintosh-like user interface. Public domain.
Current status: Version 2.0 completed.
Contact: Günther Sawitzki, StatLab, Im Neuenheimer Feld 294, D 6900 Heidelberg, West Germany

Education

CourseMaker

Developed at the University of Nebraska, CourseMaker is an authoring system for the Macintosh. It is not intended to compete with high-end authoring systems, but rather to provide an easy-to-use, inexpensive, yet powerful alternative. Any instructor who can use the Macintosh for word processing should be able to master the program in less than half an hour.

CourseMaker lets users design screens with any number of windows and buttons. Once made, any element may be edited or deleted. Windows may be used to display text or graphics, or as blanks for student input. The screen sequence is determined by dragging the pointer from a button (for example, "Next") to the appropriate screen. All operations are controlled either through menus or by clicking and dragging. CourseMaker presents two views: one for working on the design of a particular screen; the other an expanded view showing all the screens, which is used for sequencing.

Using CourseMaker, a complete freshman composition course has been developed. The course sets problem-solving tasks, provides general and specific aids to invention, encourages revision based on reconsideration of and reflection on what other students have written, provides models of student writing, exercises, journal-writing topics, and more. It seeks to encourage fluency, awareness of the writing process, and the ability to use writing as a means of learning, all in the atmosphere of a workshop.
Current status: Beta testing.
Contact: Steve Boyd or Gerry Brookes, English, University of Nebraska, Lincoln, NE 68588-0333; AppleLink: U0128

Engineering

Chemical Engineering Projects

A program to model heat transfer in a human finger has been written in Microsoft BASIC (2.0 or 2.1) for a graduate course in biomedical engineering. The program considers the decrease in blood flow toward the end of the finger and also accounts for countercurrent transfer between arteries and veins. At the end of the finger, the series-parallel model of Mitchell and Myers (*Biophys. J.* 8:897, 1968) is used.
Current status: Preliminary version finished, but further development ongoing.

A program in Microsoft BASIC (2.0 or 2.1) models the clearance of barbiturate from the body using an artificial kidney. The program, written for a graduate course in biomedical engineering, considers the body in a four-compartment model with blood and tissue subcompartments in equilibrium as described by Dedrick and Bischoff (*Chem. Eng. Prog. Symp. Ser.* 64:32, 1968). Transfer equations are solved using a fourth-order-Runga-Kutta algorithm.
Current status: Preliminary version finished, but further development ongoing.

A simple function-plotting program has been written in Microsoft BASIC (2.0 or 2.1) to plot any function provided in a subroutine. The program makes use of windows, buttons, and pull-down menus to allow easy selection of the plot features. The resulting plot can be reproduced on the ImageWriter with full-page resolution or can be transferred to other graphics programs (such as MacDraw) for further enhancement.
Current status: Completed.

Several programs are being developed in Microsoft BASIC (2.0 or 2.1) to fit a set of x-y data to linear, quadratic, cubic, or exponential functions to a curve and plot the data and/or the fit. The programs make use of windows, buttons, and pull-down menus to allow easy selection of the plot features. The resulting plots can be reproduced on the ImageWriter with full-page resolution or can be transferred to other graphics programs (such as MacDraw) for further enhancement.
Current status: Completed.
Contact: Ken Solen, Chemical Engineering, 350-G CB, Brigham Young University, Provo, UT 84604; (801) 378-6237

Engineering

MacHEATRAN

During the last three semesters, mechanical engineering students have developed a user/tutorial package for the Macintosh. (It works best on computers with at least 512K of memory.) The software, called MacHEATRAN, is designed for use in conjunction with any common heat-transfer textbook. The mechanical engineering department has made a Macintosh lab available to students using MacHEATRAN. The programs are menu driven and include the following subjects:

- Introduction to conduction, convection, and radiation as covered in the first chapter of many texts.
- Steady state conduction through composite walls (all three coordinate systems).
- Fins, called "extended surfaces" in most texts.
- Conduction shape factors for 24 shapes.
- Convection heat-transfer coefficient and friction in duct flow.
- Convection heat-transfer coefficients for flow across single tubes and tube bundles, including pressure drop across tube bundles.
- Free convection, external, and enclosed flows.
- Radiation configuration factor.
- Flat-plate heat-transfer coefficient and boundary layer thickness for both free and forced convection and both laminar and turbulent flow.
- Heat exchangers, using a combination of LMTD and the effectiveness-NTU method.
- The electrical resistance network method (Oppenheim's) for solving radiation problems for net heat transfer between two, three, or four surfaces where the geometry and surface properties are known.
- Lump capacity system analysis where up to six lumps represent the problem. Any of the lumps can be connected to a constant temperature source or a constant temperature sink. A heat source can drive any or all of the lumps.
- Uniform heat generation for steady state (all three common coordinate systems).
- A lumped capacity program set up just to solve the same type of problems solved by the Heisler charts (again, all three coordinate systems).

- A linking portion of a program set up so the user can add an application program called TRY YOUR SKILL to the MacHEATRAN disk.

Some fluid properties are included in the software and can be called automatically by the name of the fluid. The program is in Microsoft BASIC 2.0. This software is designed for the beginning heat transfer student or as a refresher for the rusty student. It is a tutorial disk, but is also appropriate for the person who does an occasional heat-transfer estimate in engineering work. Experts in heat transfer will probably find this program too simple. With user's manual, the package is available for $95. Site licenses are available for $295.
Current status: Completed.
Contact: Richard Ulrich, Mechanical Engineering, 242-J CB, Brigham Young University, Provo, UT 84604; (801) 378-6542

Languages

International Fonts

The International Fonts support word processing in hundreds of languages. They consist of four fonts: International Roman, Greek, Cyrillic, and Phonetic. They enable typing in all the Western European languages and many more besides. The Roman font has four dozen diacritical signs (which may be used above upper-case letters) and extra characters; the Greek supports both the classical and modern languages; the Cyrillic supports more than a dozen languages, including pre-revolutionary Russian; the Phonetic is based on the IPA.
Current status: Completed. For a disk of all four fonts and instruction manuals, please send U.S. $21.75 ($22.75 outside North America) for use on up to three machines; other prices on request.
Contact: Prof. Paul Rapoport, 7 Cradock Court, Ancaster, Ontario L9G 3Z5, Canada

Private Tutor System

The Private Tutor System enables teachers to convert exercises quickly and easily from foreign language textbooks into a format (including graphics) that will run on the Macintosh. Students can receive question-by-question tutoring, analysis of errors, and various other helpful information. The system automatically keeps track of the student's progress and creates a review exercise upon demand. The teacher can also use the system to perform an error analysis of the student's answers. The Private Tutor System has been successfully tested by students at Yale University. It was written by Stephen Clausing, Assistant Professor, German Department, Yale University.
Current status: Completed and in use.
Contact: Stephen Clausing, 408 Thoreau Road, Branford, CT 06405

Math & Statistics

Limcon

This program is an introduction to limits and continuity, suitable for beginning calculus students. The program is menu-driven with 13 separate modules. Seven modules discuss limits and six discuss continuity. The types of limits included are of the form: A/B where B≠ 0, A/O where A ≠ 0, 0/0, A/∞, and ∞/∞. The continuity modules discuss missing point, finite, and infinite discontinuities, as well as vertical and horizontal asymptotes. Each module includes examples with accompanying graphs and problems to solve. Also included is a quiz on the limit modules and one on the continuity modules.

Current status: A complete version of the program in DAL is running on our VAX system. The Macintosh version will be completed by spring 1988.

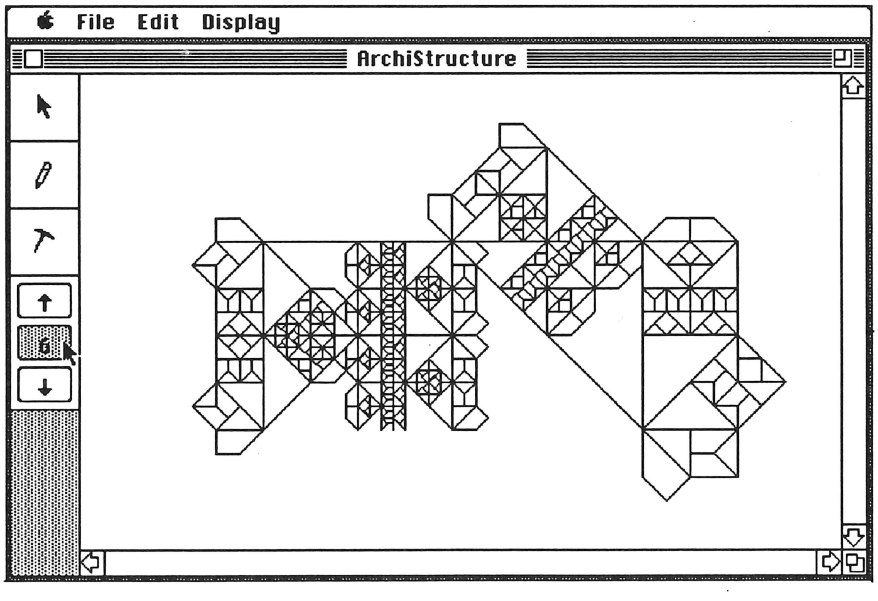
Contact: Dr. David G. Beane, Professor of Mathematics, Mathematical Sciences, The College of Wooster, 2436 Monterey Street, Wooster, OH 44691; (216) 263-2389

MetaForm

MetaForm is a design tool for exploring the realm of self-similar forms. Trees, tesselations, textures, symmetries, space-filling curves, shorelines, phylotaxis, and spirals are all examples of self-similar phenomena that are conveniently handled by the program. The user creates motifs and transformations by drawing and dragging. These are nested repeatedly to generate forms of intriguing visual complexity. Modest changes to the original motif ripple throughout the entire structure, often producing startling results.

Current status: A prototype of MetaForm is in use; a distribution version will be available by fall 1987.

Contact: Chris Carlson, Center for Art and Technology, Carnegie Mellon University, College of Fine Arts, Rm 111, Pittsburgh, PA 15213; (412) 268-3454



Math and Statistics

Statistical Subroutines

The Statistical Laboratory of the Universitat Heidelberg is building a public domain library of statistical subroutines. The library comprises classical algorithms (adapted to use the full range of IEEE arithmetics) as well as algorithms from recent research and classroom demonstration programs. All programs are written in Pascal. The full source is in the public domain.
Current status: Ongoing.
Contact: Gunther Sawitzki, StatLab, Im Neuenheimer Feld 294, D 6900 Heidelberg, West Germany

Ternary Plot

Ternary plots are triangular diagrams that graphically depict a three-component system. Each side of the triangle represents a two-component system. Ternary plots are used extensively in the earth sciences for graphical classification and analysis of chemical and mineralogical composition of rocks. Any three-component system may be represented, for example, composition, shape, texture.

Ternary Plot will normalize and plot three values on an equilateral triangle. Triangles of two sizes are available. A plot title and apex labels can be entered. Multiple data sets can be plotted on the same diagram using a variety of different symbols. Grids and tie lines can be drawn with line-plotting and line-drawing tools. A freehand drawing tool can be used to encircle groups of data, and an eraser is provided to remove mistakes or even bad data points. Grids (or any graphic) drawn in a MacPaint-type format can be copied to the Clipboard, then subsequently transferred into any other application or pasted into the Scrapbook. Various grids or data plots can be kept in the Scrapbook for future use. Several predrawn grids are provided in the Scrapbook in the System Folder on this disk.

Plotting ternary diagrams by hand can be tedious and very time-consuming. If you must display your data on a triangular diagram, Ternary Plot will generate professional-looking Macintosh output in a small fraction of the time it would take to plot the data by hand. If Ternary Plot has saved you time or money and you received it via modem or a friend, please send $15. Send $20 for a disk with the most recent versions of Ternary Plot, Scrapbook, and documentation, as well as a hard-copy version of the documentation. For a fee, I will customize the graphical output, scaling of the axes, mathematical conversions, or any part of this program.

Ternary Plot is shareware. You may freely distribute it to anyone. But please keep this document and the Scrapbook together with the application.

Current status: Completed
Contact: Pierre A. Zippi, 60 Mountainview Ave. #410, Toronto, Ontario M6P 2L4, Canada; (416) 766-4077 (mornings)

Medicine and Nursing

Iliad and Odyssey

The Department of Medical Informatics at the University of Utah is using the Macintosh to develop a package of tools designed to help clerkship-level medical students manage medical information resources and learn good decision-making skills. The package consists of several concurrently developed projects, two of which are Iliad and Odyssey.

Iliad is a Macintosh subset of the HELP (Help Evaluation through Logical Processing) Hospital Information System. As a teaching tool, Iliad allows clinicians and students to interactively record a patient's medical findings on the terminal. Iliad then runs various decision-making subprograms ("frames") against initial findings and generates specific patient and physician-directed questions. After obtaining answers to these questions, Iliad generates a list of suggested differential diagnoses.

Odyssey provides a common, easily used front end to search several selected data bases. This program uses a concept of hierarchically connected "relations" of medical concepts. Relations allow Odyssey to accept common English terms, yet perform powerful searches. Two data bases are currently implemented on the Odyssey system. The first is a clinically relevant, expert-filtered subset of the medical literature constructed especially for students. The other is composed of teaching models of decision-making strategies from the HELP mainframe system. Access to other data bases, such as a hypertext book of internal medicine, is planned. Both programs are available to students and staff via Macintosh computers placed in medical wards at the University of Utah Hospital.

Current status: Ongoing.

Contact: Dr. Homer Warner or Curtis L. Anderson, Department of Medical Informatics, AB193 Medical Center, University of Utah, Salt Lake City, UT 84112

EKG Project

Randy Ostler and Joe Barrus, seniors in electrical engineering, have built a general-purpose serial interface with software that makes the Macintosh capable of reading analog as well as parallel signals. The hardware consists of a general-purpose serial interface device to which specialized add-ons can be connected. For example, the current project is an EKG device that will provide an economical way for a doctor to view a patient's electrocardiogram. Instead of purchasing specialized electrocardiograph hardware, a doctor can purchase a Macintosh with the required add-on hardware, and use the Macintosh for other purposes (such as bookkeeping, billing, and scheduling) as well as patient monitoring. The EKG leads connect to an add-on device (also designed by Randy Ostler and Joe Barrus) with analog circuitry that amplifies the signal for the general-purpose interface. The EKG information is then passed through the serial port of the Macintosh. Analog data coming from the EKG leads is displayed on the

Medicine and Nursing

Macintosh screen in real time. The software will be capable of performing basic signal processing to filter out unwanted frequencies. Further enhancements will include oscilloscope and logic analysis applications.
Current status: Completed.
Contact: Randy Ostler and Joe Barrus, 417 CB, Brigham Young University, Provo, UT 84604; (801) 378-3812

Antimicrobial Agents

This HFS data base contains more than 100 chemical structures of current and developmental antimicrobial agents. Each structure is easily transferred to MacWrite, Microsoft Word, or other program documents for use in laboratory manuals, textual material, and the like.
Current status: Version 1.1 completed.
Contact: Prof. James T. Griffith, Corsair MicroGraphics Project, Department of Medical Technology, Southeastern Massachusetts University, North Dartmouth, MA 02747; (617) 999-8329

Review of Human Physiological Defense Mechanisms

Faculty of the University of Utah College of Nursing are developing a computer-assisted instruction tutorial for the review of content pertaining to the immune, inflammatory, and coagulation systems.
Current status: In development.
Contact: Beryl M. Peters or Sandra H. Haak, College of Nursing, University of Utah, 25 South Medical Drive, Salt Lake City, UT 84112

Miscellaneous

MacChoro

MacChoro is a computer mapping, data classification, and map-design program to produce choropleth maps. The choropleth method, which uses shadings to represent values, is one of the most common methods of statistical mapping. The program includes four common methods of data classification: standard deviation, equal-interval, quantile, and natural breaks, plus a user-defined option. Each may be displayed with 2 to 16 classes. Since polygon data are kept in memory, maps are updated quickly, allowing the user to view the data with a variety of classification options. MacChoro also incorporates data manipulation capabilities. Data may be modified through division, multiplication, subtraction, addition of/by another data set or a constant. Logarithm and square root transformation of data also are possible. MacChoro is intended as a tool for geographical data analysis, creating maps for publication, and evaluating the different methods of data classification. Presently available maps include: United States by state and county, Canada by province, North America by country, South America by country, Europe by country, Africa by country,

Miscellaneous

Asia by country, and the world by country. A separate program, polyEXTRACT, creates map files of U.S. counties from a data base of 32,865 coordinates and 3,980 polygons. Both programs require at least 512K; polyEXTRACT requires an 800K drive.
Current status: Completed.
Contact: Michael Peterson, Department of Geography/Geology, University of Nebraska at Omaha, Omaha, NE 69182

Image Analysis System

An Image Analysis System has been developed based on the Macintosh computer. In addition to the computer, it consists of a microscope, video camera, 25mm lens, monitor (necessary for focusing), Switcher, New Image Magic hardware and software, and an Image Analysis program that does the calculations. Exclusive of the cost of the Macintosh and microscope, the system can be put together using quality components for less than $1,000.

The program is designed for the serious research investigator who needs an inexpensive method of quantitating the stereological features captured on video images. Basically, MacPaint files of video images of the specimens to be analyzed are saved using the black-and-white option of the Magic program. Transfer to Image Analyzer is made using Switcher; the file is opened and the image is edited and processed. The present version will determine area, perimeter, and chord numbers of full screen, variable rectangles, and irregularly shaped areas circumscribed freehand. Editing features include fill, inversion, framing, and smoothing. A routine is provided for making outline drawings that can be input as data for three-dimensional image analysis. Three sizes each of black-and-white erasers are available. Provision is made for entering magnification factors. The option of saving edited images as MacPaint files is also provided.

The system has been used with transmitted and reflected microscopic images as well as photographs placed on copy stands. Editing accuracy is improved by using a digitizing pad. Available from KSS Computer Engineers, 3048 South Breeze Drive, Magna, UT 84044.
Current status: Completed. For a disk with program and manual, please send $100.
Contact: Gerry H. Kenner, Ph.D., Systems Analyst, TL Laboratory, Building 351, University of Utah Medical Center, Salt Lake City, UT 84112

Stereology Program

Program written for use with MacTablet or any other digitizing tablet that inputs into the mouse storage registers. Using the cursor, structures can be traced and their areas, perimeters, numbers, and/or widths determined. A structure-counting routine is also provided. Sixteen features can be quantitated for each view of a specimen. Provision is made for entering magnification factors.

Special features include an edit box for recording observations made while making measurements and an option for storing tracings as MacPaint files. Data is saved in text format for easy transfer to statistical, spreadsheet, or data-base programs. Available from KSS Computer Engineers, 3048 South Breeze Drive, Magna, UT 84044.

Miscellaneous

Current status: Completed. For a disk with program and manual, please send $100.
Contact: Gerry H. Kenner, Ph.D., Systems Analyst, TL Laboratory, Building 351, University of Utah Medical Center, Salt Lake City, UT 84112

Joystick Rotation

A program for using a joystick for manual tracking of circular clockwise and counterclockwise movement of experimental animals or devices, with manual and timed termination of data collection cycle. Output (screen and disk) includes sequential pattern of movements, number of full turns CW and CCW, and some statistics relating to these values. Editing is allowed during data collection (backspacing) and analysis (insertion and deletion). Available from KSS Computer Engineers, 3048 South Breeze Drive, Magna, UT 84044.
Current status: Completed. For a disk with program and manual, please send $100.
Contact: Gerry H. Kenner, Ph.D., Systems Analyst, TL Laboratory, Building 351, University of Utah Medical Center, Salt Lake City, UT 84112

AppleTalk Protocols for UNIX BSD4.2

Columbia University has implemented a portion of Apple Computer's AppleTalk protocols for UNIX® BSD 4.2 and Ultrix. CAP routines are structured, for the most part, the same as the Apple routines described in *Inside AppleTalk* and *Inside LaserWriter*. A version of an AppleTalk Filing Protocol UNIX FileServer (AUFS) has also been developed. A UNIX® machine running BSD 4.2 may provide network services to AppleTalk networks, including file and print services. Use of this software requires an AppleTalk/Ethernet bridge, such as Kinetics FastPath.

This software allows you to use AppleShare file-server software without a dedicated Macintosh computer. Presently, Columbia has two gigabytes of accessible memory for the campus on a VAX via this method.
Current status: Available now. There is no charge, however, it may NOT be incorporated into a commercial product or a product developed for sale.
Contact: Rob Cartolano, User Services, 612 W. 115th St., New York, NY 10025

Fluid Power Symbols

These are MacPaint templates of the symbols used to draw hydraulic and pneumatic power and control circuits. The symbols in the templates are, in nearly all instances, identical to those found in the relevant ANSI and ISO standards. The standards that the various symbols are from and the degree to which each set is completed are listed below:
Current status:

Conventional ANSI symbols, Y32.10	98% completed
ANSI ladder (detached Symbols), B93.38	70% "
ANSI logic (attached Symbols), B93.38	90% "
Conventional ISO symbols, 1219	40% "
ISO logic symbols, DP 5784	100% "

Contact: David Pilichowski, Mott Community College, 1401 E. Court St., Flint, MI 48502; (313) 762-0500; GEnie Address: DPilichowski

Music

Appletones

Appletones is used in introductory music composition courses. It is a tool that teaches the importance of four things in the composition and arrangement of music: repetition, silence, changes in volume, and timbre. Twelve predefined sounds can be arranged, and their duration, timbre, and volume can be changed. The user composes a piece by dragging any of the available sounds from a palette onto a staff. The vertical position of the sound determines its timbre, the width of the sound determines its duration, and its height determines its volume. Any sound may be changed in any of these parameters at any time, and cut-and-paste editing is also available. The piece may be played on the Macintosh system's built-in speaker or saved to disk for later retrieval. The score may be printed on an ImageWriter printer. Version 2.0 has all the help present in the application file (no separate file), and a startup screen.
Current status: Version 2.0 is available.
Contact: Kinko's ACE 800-235-6919; in California, 800-292-6640

Mozart

Mozart is used in introductory music composition courses. It is intended to give the music student with no formal experience in composition the opportunity to experiment with musical arrangement, tempo, articulation, and dynamics. It allows the user to compose a minuet from any of six predefined two-measure phrases written by Mozart. The minuet may be up to eight phrases long. The user controls the arrangement of the phrases, as well as tempo, articulation, and dynamics, by dragging items from any of four palettes onto a staff. The minuet may be played on the Macintosh system's built-in speaker or saved to disk to be retrieved later. The staff may be printed on an ImageWriter printer. Version 2.0 has all the help present in the application file (no separate file), and a startup screen.
Current status: Version 2.0 is available.
Contact: Kinko's ACE 800-235-6919; in California, 800-292-6640

Practica Musica

Version 1.0 has seven levels of theory testing and six levels of ear training. The theory drills teach the spelling of intervals and chords. The student is required to enter the requested interval or chord on the screen. The program evaluates the student's response and if it is incorrect, it provides the corrected version. The sound is digitally sampled from actual organ pipes. Chords range from simple triads to the augmented sixths. An ear-training module requires the student both to identify the sounded interval by name and to find it on the keyboard. A section on melodic dictation will be added soon. Included in the documentation is a short text containing a thorough summary of the principles underlying the nomenclature of scales, intervals, and chords in tonal harmony.
Current status: Unknown.
Contact: Periscope Press, P.O. Box 6926, Santa Barbara, CA 93160; (805) 683-4732

Philosophy

Venn

Venn is used for teaching syllogisms and Venn diagrams in introductory philosophy courses. It allows the student who knows about syllogisms to practice solving them by using Venn diagrams. It offers:

- Practice with Venn diagrams on single logical sentences.
- Use of Venn diagrams on single-sentence inferences.
- Use on full syllogisms (two premises and an inference).

Venn randomly makes up syllogisms and shows them; the student represents the premises with a Venn diagram, using MacPaint-like filling of regions with patterns. The program checks the diagram, and the student indicates whether he or she believes the syllogism to be valid or invalid. The program tells the student whether he or she is correct. Version 2.0 has Help files, defaults to Sentence mode, and has other more minor changes. Version 2.1 fixes a bug (introduced by the new Macintosh ROM) in the ordering of the Help menu.
Current status: Version 2.1 is available.
Contact: Kinko's ACE 800-235-6919; or in California, 800-292-6640

Physics

Computer Simulation

An Introduction to Computer Simulation: Applications to Physical Systems, a new textbook by Harvey Gould and Jan Tobochnik has been published by Addison-Wesley. The book is designed for an intermediate course on computer simulation but can also be used as a supplement to an introductory course in physics, and courses on mechanics, statistical physics, waves, electricity and magnetism, quantum mechanics, and physical chemistry. Each chapter has a brief summary of the important physics and algorithms, lists programs in True BASIC, and contains problems that require student modifications of the programs. A double-sided disk with listings of the True BASIC programs and translations of many of them into FORTRAN and Macintosh Pascal is also available. Future projects include modification of the programs to make them more suitable for lecture demonstrations. We are also planning to write additional software for a new introductory physics course at Clark University and Kalamazoo College.

Physics

Current status: Textbook and disk complete and available from Addison-Wesley. Some programs for lecture demonstrations will be available by fall 1987.
Contact: Harvey Gould, Clark University, Department of Physics, Worcester, MA 01610; (617) 793-7485 or Jan Tobochnik, Kalamazoo College, Department of Physics, Kalamazoo, MI 49007; (616) 383-8451

Sociology

SocStat

SocStat is a sociology statistics laboratory on a Macintosh. It uses studies prepared from actual sociological surveys and allows the student to do elementary statistical analyses on them. Each study consists of up to 16,000 observations on up to 10 variables; each variable may have any of several values (responses by the subjects of the survey). The student can select a study and perform any number of analyses on it: absolute or relative frequency tabulations, cross-tabulations (with dependent, independent and possible control variables), Yule's Q and Gamma tests, and chi-square tests. The results of each analysis appear in a window. Many windows can be created. Any window can be printed and handed in to the instructor as homework. New studies can be quickly created using the companion program SocStudy (see description elsewhere). Version 2.0 has many significant changes. The user interface is far simpler and more modeless; the menus are simpler; the program handles larger studies and is much faster; studies are easily created with SocStudy and are smaller; it is HFS and 128K ROM compatible; there is complete Help text; and a new "Change to..." feature allows easy modification of existing analyses.
Current status: Version 2.0 is available.
Contact: Kinko's ACE 800-235-6919; in California, 800-292-6640

SocStudy

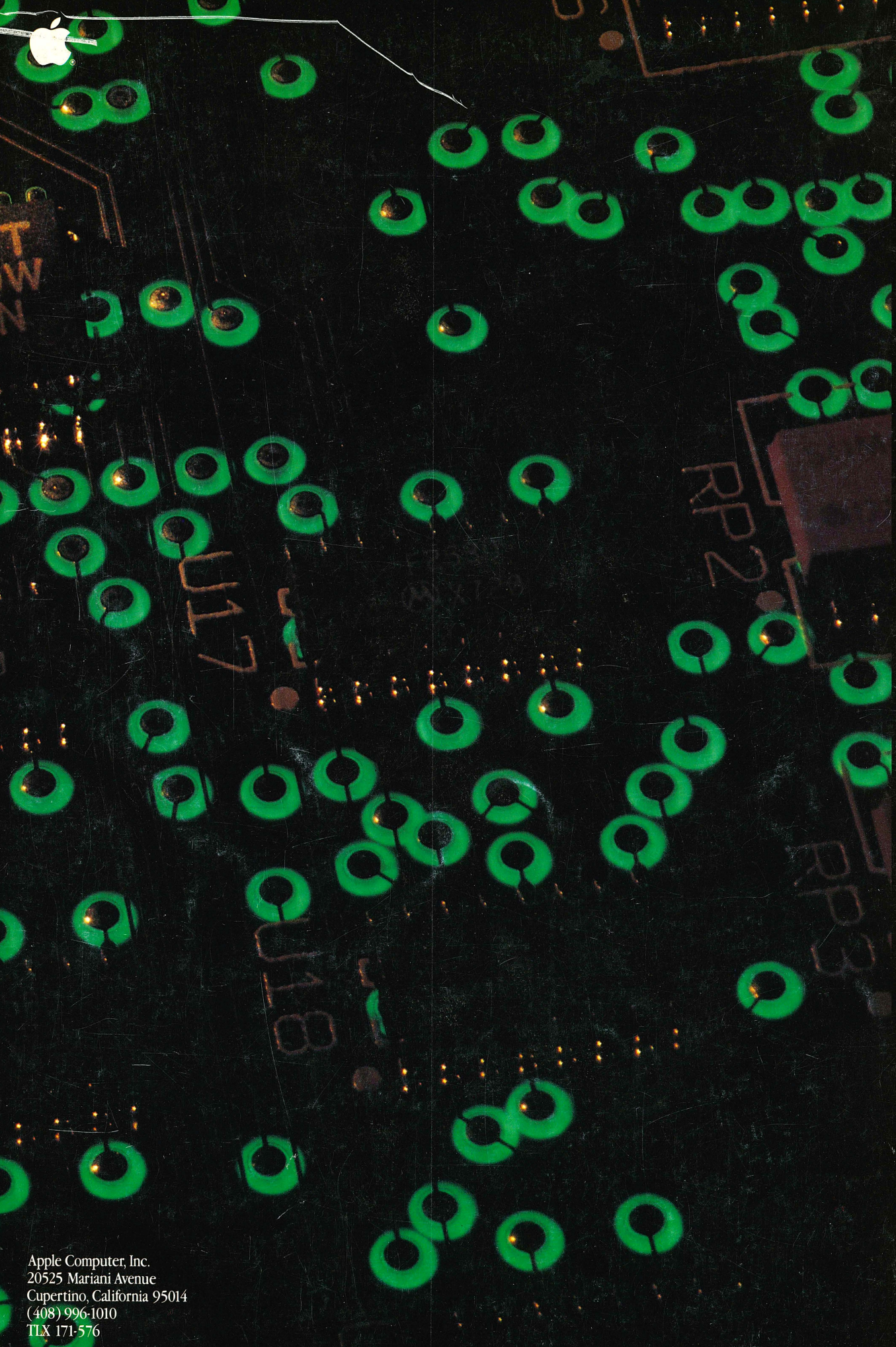
SocStudy allows an instructor to edit old or create new studies for SocStat. For new studies, the instructor must first create on the Macintosh a set of number files that contain the responses, one column of ASCII numbers per file. SocStudy reads those files and accepts other input in modeless dialogs (one per variable plus one per study), and creates a new study in SocStat's binary format. Existing studies can be opened and edited in the same manner. The instructor can extract the responses from existing SocStat studies and put them into a file of numbers. Old studies are displayed in their entirety; any part can be changed, and new data can be read in.
Current status: Version 0.9 is available.
Contact: Kinko's ACE 800-235-6919; in California, 800-292-6640

Teaching Writing at U.C. Davis

Over the last year, I've been responsible for both physical layout of a Macintosh classroom and the curriculum for its scheduled writing courses. These classes range from English A (our most basic composition offering) and English I (freshman composition) to English 103A (advanced composition), English 103C (feature writing), and English 102 (adjunct writing). We have 160 students currently enrolled in our Macintosh classes, and we expect that number to grow steadily over the next five years. We chose the Macintosh for our program because we feel that it is the best computer available for writers—after all, as we like to remind our students, we teach writing, not word-processing. Our Macintosh classroom—which features a Macintosh Plus computer for each of our students, as well as a networking system (currently MacServe, soon to be AppleShare) and an Electrohome projector—is the best possible environment for teaching writing.

Current status: Ongoing.

Contact: Eric James Schroeder, Department of English, University of California at Davis, Davis, CA 95616; (916) 752-8024



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Apple Macintosh WHEELS FOR THE MIND SUMMER 1987 Vol. 3 No. 3